



Monitoring Times



AOR AR8200 Mark II B & AR8600 Receivers

Welcome to the Top Shelf



AOR wide-range communications receivers are designed and built for the serious user. Among our customers are governments and government agencies, news gathering operations, military units, laboratories, public safety operations and more. If you are a demanding user who expects the best, you're ready for AOR, The Serious Choice in Advanced Technology Receivers.™ Don't look for AOR on the bottom shelf at your local discount store, you won't find us there. For dealer locations, check our web site, www.aorusa.com



**Technology so advanced,
it's patented** (US Patent 6,002,924).

AR8200 Mark II B

Base performance in a hand-held receiver!

- 530 KHz - 2040 MHz * coverage
- 1,000 memory channels (20 banks) with alphanumeric labeling
- Computer control and programming (requires optional cable)
- Download free control software from AOR web site
- "All Mode" reception includes "super narrow" FM plus wide and narrow AM and USB, LSB, CW and standard AM and FM modes
- True carrier reinsertion in USB and LSB modes
Includes 3 KHz SSB filter!
- Detachable MW antenna with negative feedback
- Optional internal slot cards expand capabilities. Choose from Memory Expansion (up to 4,000 memories), CTCSS Squelch & Search, Tone Eliminator, Voice Inverter** and Record Audio (saves up to 20 seconds of audio)
- Tuning steps programmable in multiples of 50 Hz in all modes
- 8.33 KHz airband step is correctly supported
- Noise limiter and attenuator
- Lighted keys
- Band activity "scope" display with "save trace" capability
- Four-way side panel rocker switch allows one-hand operation
- Large display includes A and B VFO frequencies and signal strength meter
- Battery Save function with Low Battery Indicator
- Operates on 12 VDC external power
- 4 AA Ni-Cd batteries supplied, also uses standard AA dry cells
- BNC antenna connector
- Wide choice of accessories

AR8600 Base/Mobile

Think of it as a magnet for signals.

- Temperature Compensated Crystal Oscillator (TCXO) ultra-stable frequency reference
- Coverage from 530 KHz - 2040 MHz*
- Receive Modes: WFM, NFM, SFM, WAM, NAM, USB, LSB, CW
- New front end and RF stages for superior sensitivity
- 2 VFOs (A/B)
- 1000 memory channels (20 banks x 50 memories/bank)
- Alphanumeric channel labels
- Scan rate up to 37 channels/second
- Add up to 3 optional slot cards: Tone eliminator, CTCSS, Voice Inversion**, Recording, External memory
- Accommodation for Collins® Mechanical Filters
- RS-232C port
- 10.7 MHz IF output (WFM mode only) can be used with SDU 5500 Spectrum Display Unit
- 12 VDC operation
- BNC antenna connection
- Download free control software from AOR web site

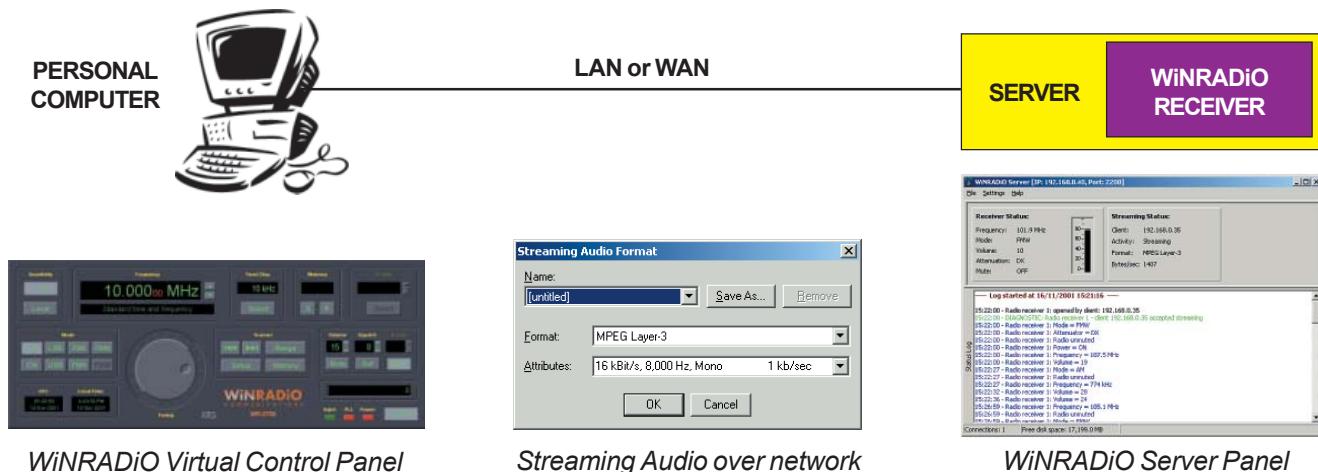
*Cellular blocked. Unblocked version available to authorized users; documentation required. **Available to authorized users only. Specifications subject to change without notice or obligation. All trademarks remain the property of their respective owners.

Control your WINRADIO receiver remotely!

Now you have two options.

Option 1: Using WiNRADiO Client/Server

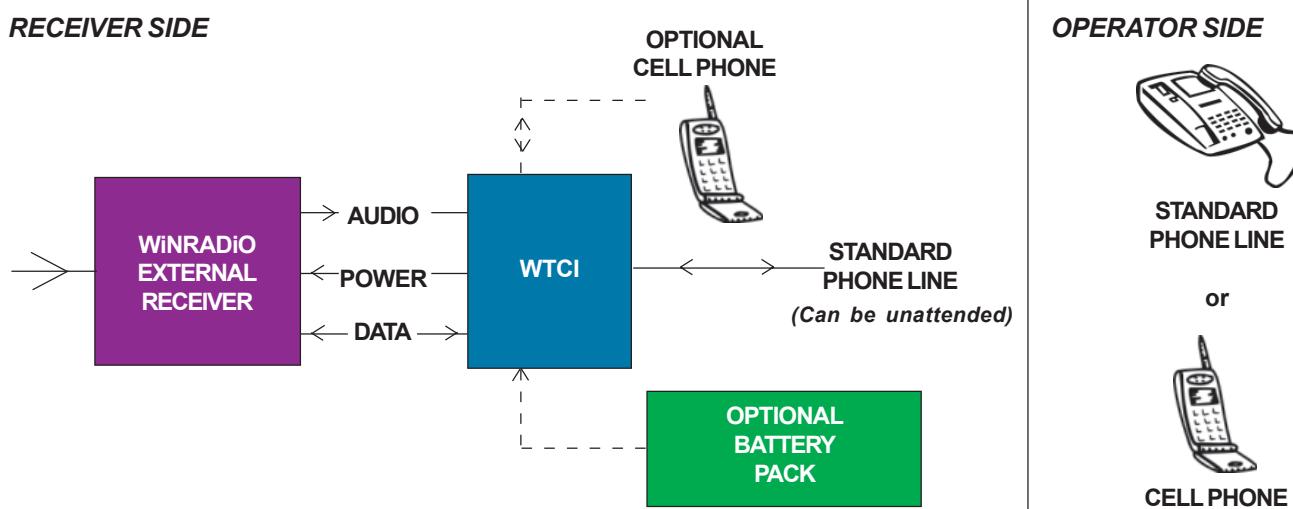
The WiNRADiO Client/Server Option can control WiNRADiO receivers across all types of computer networks supporting the TCP/IP protocol. With a network interface and real-time audio streaming facility, it provides effective remote control of your WiNRADiO receiver system.



Option 2: Using WiNRADiO Telephone Control Interface (WTCI)

The WTCI is connected between a WiNRADiO external receiver and a standard phone line, or optionally a cell-phone. The user can control the receiver remotely using DTMF (touch-tone) commands, and the WTCI unit confirms received commands using a digitized voice. Received audio signals can then be listened to by the user in real time.

There is no limit on how far the receiver can be located from the listener, as long as a telephone service exists at both locations. The WTCI unit is therefore suitable for remote monitoring of transmitters in law enforcement, broadcasting and industrial, government and military applications.



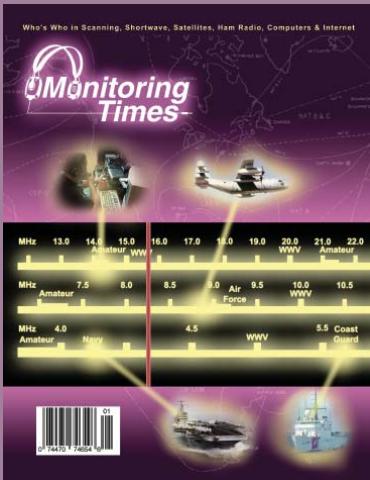
For more information on WiNRADiO remote control products, please visit:

www.winradio.com
info@winradio.com



Vol. 21, No. 1

January 2002



On our Cover

Who's Who in the Radio Spectrum?

By Larry Van Horn

For the first time since 1985, *MT* embarks on an analysis of spectrum assignments from the bottom to the top. The big difference is, today's hobbyists can tune in all of it on one general-coverage receiver!

In fact, affordable, wide coverage receivers offer such enormous possibilities, a new owner may feel overwhelmed. Where do you start? Is there really anything to be heard at the lowest and highest reaches of your receiver? What the heck are all those noises? Where should you tune to find amateur radio conversations? Broadcasters? Military aircraft? The local fire department? Tuning around at random can be fun, too, but then how do you know what you're hearing?

This several-month series is a "keeper" – one to keep by your radio, that is. This month we start 'way down in radio's basement where Mother Nature and a whole company of interesting folks like to hang out. Story starts on page 10.

Cover illustration by Hugh Stegman.

Emergency Communications 14

By KenWindyka

Americans don't like to be far away from some source of human contact, especially in case of an emergency situation away from home. But who do you call and how? The answer to this question will largely determine what kind of communications device you purchase. The options are greater today than ever – cellular or PCS phone, CB radio, Family Radio Service or the new Multi-Use Radio Service radio, or even marine radio. Each has its pros and cons.

Sky Wars 17

By Ken Reitz

The much-ballyhooed satellite radio service is getting off to a rocky beginning. Technical and legal delays slowed the introduction of the two competing systems, Sirius and XM, to coincide with dismal economic conditions. However, XM Satellite did make it on the air at the end of September, and Sirius Satellite Radio has just announced February 14th as their launch date. Will this bold venture pay off or go the way of the Iridium satellite telephone debacle?

65 Years of Radio Prague 20

By Bill Bergadano

Radio Prague began its first transmissions over the relatively untested medium of shortwave on August 31, 1936. Experienced listeners are aware of its difficult history with Nazi and Soviet domination or outright control. Throughout it all, however, Radio Prague has remained committed to broadcasting beyond its borders and remains one of the most listener friendly stations on shortwave.



FUTURE ISSUES:

MTXPRESS

For less than the cost of a subscription in the U.S., you can be reading the entire *Monitoring Times* magazine anywhere in the world before U.S. subscribers receive their printed copies! Active utilities loggings, world hotbed frequencies, international broadcasting schedule changes, new product announcements! This is the exact same magazine that has gained a worldwide reputation for reliable radio information that's easy to understand, and products and projects of proven value.

For a mere \$19.95 U.S., **MT EXPRESS** gives you *Monitoring Times* magazine

- in PDF format viewable with free software
- delivered by FTP (10 MB file)
- viewable in brilliant color on your computer screen
- easily navigated by clicking on the Table of Contents
- printable using your own computer printer
- searchable to find every mention of a topic or station schedule
- importable into your frequency databases
- compatible with software to convert text to audio for sight impaired listeners

To find out if this new subscription is the delivery solution for you, you may download a sample issue for free! Just go to <http://www.grove-ent.com> to find out how.

One year subscription to **MT EXPRESS**— only \$19.95 U.S., or for even greater savings, \$11 in addition to your printed subscription of \$25.95 in the U.S.

www.grove-ent.com

THE website for ALL of your scanner and shortwave needs!

The Future and the Past come together on your computer!

Past Issues:

MT Anthology



Imagine, your favorite MT articles and columns for an entire year on one searchable CD-ROM! Frequency lists, shortwave program guides, equipment reviews, construction tips, antenna projects, scanner and shortwave topics, even ads -- all on one powerful CD! And we even include Adobe Acrobat Reader at no extra charge!

Each CD-ROM contains the full year's issues. The 2001 CD-ROM, with the complete contents from the year 2001 is now available. Put your order in now to make sure you have THE reference material no radio shack should be without!



Order SFT-27-01 (2001)

Order SFT-27-00 (2000)

Order SFT-27-99 (1999)

Only \$19.95 each! (\$14.95 for subscribers)
plus \$2.50 First Class or \$5.95 UPS

Grove Enterprises, Inc.

(800) 438-8155; (828) 837-9200

(828) 837-2216 fax

7540 Hwy 64 W; Brasstown, NC 28902

order@grove-ent.com

www.grove-ent.com



MONITORING TIMES
(ISSN: 0889-5341;
Publishers Mail
Agreement #1253492)
is published monthly
by Grove Enterprises,
Inc., Brasstown, North
Carolina, USA.

Copyright © 2002 Grove Enterprises, Inc.
Periodicals postage paid at Brasstown, NC,
and additional mailing offices. Short ex-
cerpts may be reprinted with appropriate
credit. Complete articles may not be repro-
duced without permission.

Address: 7540 Highway 64 West,
Brasstown, NC 28902-0098
Telephone: (828) 837-9200
Fax: (828) 837-2216 (24 hours)
Internet Address: www.grove-ent.com or
e-mail: mt@grove-ent.com
Editorial e-mail: mtditor@grove-ent.com
Subscriptions: order@grove-ent.com

Subscription Rates: \$25.95 in US; \$38.50
Canada; and \$57.50 foreign elsewhere, US
funds. Label indicates last issue of subscrip-
tion. *See page 90 for subscription information.*

Postmaster:
Send address changes to *Monitoring Times*,
7540 Highway 64 West, Brasstown, NC
28902-0098.

Disclaimer:
While *Monitoring Times* makes an effort to
ensure the information it publishes is accurate,
it cannot be held liable for the contents.
The reader assumes any risk for performing
modification or construction projects pub-
lished in *Monitoring Times*. Opinion or
conclusions expressed are not necessarily the
view of *Monitoring Times* or Grove Enter-
prises. Unsolicited manuscripts are accepted.
SASE if material is to be returned.

Owners

Bob and Judy Grove
judy@grove-ent.com

Publisher

Bob Grove, W8JHD
bgrove@grove-ent.com

Managing Editor

Rachel Baughn, KE4OPD
mtditor@grove-ent.com

Assistant Editor

Larry Van Horn, N5FPW

Art Director

Bill Grove

Advertising Svcs.

Beth Leinbach
(828) 837-9200
beth@grove-ent.com

Reviews:

For some kinds of interference,
only a notch filter can do the job; but is
there much difference between filters?
Bob Parnass compares filters from
Grove Enterprises, Par Electronics,
and Stridsberg Engineering (p.80).

In the Year 2002, John Catalano
finally finds his long-awaited “total ra-
dio environment” – the software that
does everything and does it well. See
why Bonito’s RadioCom 5.1 makes
the grade (p.82).

Bob Grove compares seven dif-
ferent magnetic-mount scanner and
cellular antennas against the cream of
the crop – the Nil-Jon “Super M.” The
results might surprise you (p.87).

In Jock Elliott’s opinion, NOAA
Weather Radio is one of the best re-
turns we get from our tax dollars, and
the Midland WR-10 AM/FM/weather
radio is an excellent way to take ad-
vantage of the service (p.86).

TABLE OF CONTENTS

Departments:

Washington Whispers	6
<i>Military Technology in the Private Sector</i>	
Letters	7
Communications	8
Stock Exchange	90
Advertisers Index	90
Department Staff	90
Closing Comments	92

Will Anyone be Listening?

First Departments

Getting Started

Beginners Corner	24
<i>Your Beginner’s Questions Answered</i>	
Ask Bob	26
Bright Ideas	27

Scanning Report

Assistive Listening Devices

Scanning Canada	30
<i>Scanning in Edmonton</i>	
Service Search	31
<i>HF Aeronautical Assignments</i>	

Utility World

Cuban Spy Base Closes

Utility Logs	33
Digital Digest	35
<i>New HF Modem Users</i>	

Global Forum

Two Militia BCers in Shootouts

Broadcast Logs	39
The QSL Report	40
<i>Clear Channel QSLing</i>	
Programming Spotlight	41
<i>I was just thinking ...</i>	

Listening Guide

English Language SW Guide	42
MT Satellite Services Guide	62
<i>Telstar 6, Galaxy 3R, Telstar 5</i>	

Second Departments

View from Above	63
<i>Ups and Downs of Russian Birds</i>	
The Fed Files	64
<i>9-11 Aftermath Monitoring</i>	
Tracking the Trunks	66

<i>Encryption for Security</i>	
Milcom	68
<i>Military Callsigns and More</i>	

American Bandscan	70
<i>Domestic-band radio in Afghanistan</i>	
Outer Limits	71
<i>Violence Hits Clandestine Radio</i>	

Below 500 kHz	72
<i>Try Something New in '02!</i>	
On the Ham Bands	74
<i>New Year in Ham Radio</i>	

Radio Restorations	76
<i>Books About Restoring Radios</i>	
Antenna Topics	78
<i>Ways in which Antennas Differ</i>	

MT Reviews

Scanner Equipment	80
<i>Notch Filters Fight Interference</i>	

Computers & Radio	82
<i>Bonito’s RadioCom 5.1</i>	

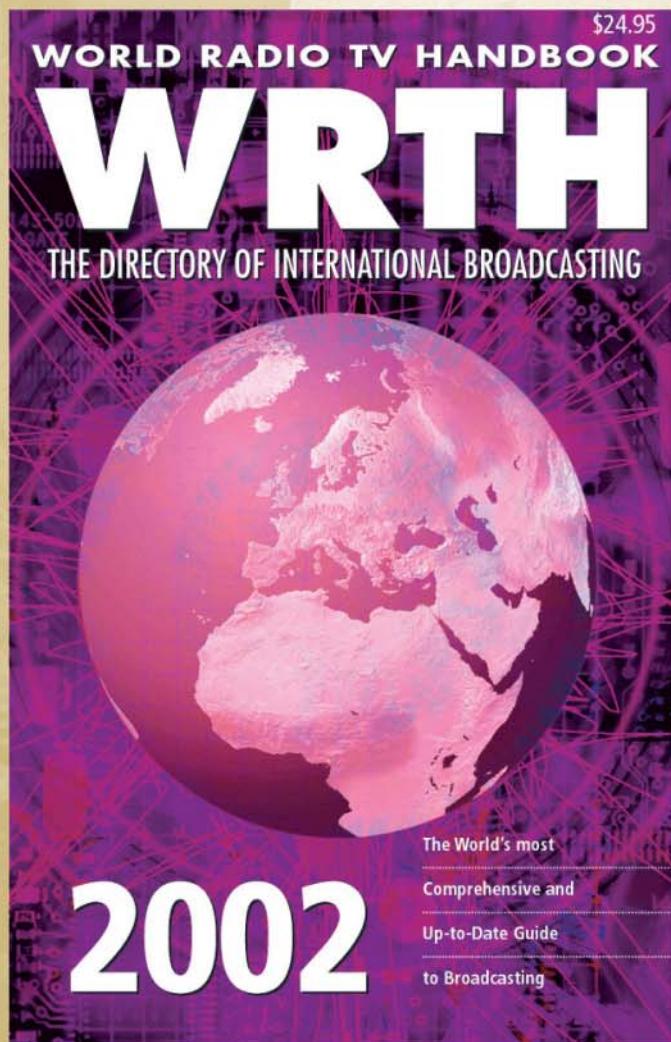
Radio Equipment	84
<i>Build a Scanner Repeater</i>	

Easy Access	86
<i>Midland WR-10 AM/FM Wx Radio</i>	

MT Review	87
<i>Magnetic-Mount Scanner Antennas</i>	

What's New	88
------------------	----

LISTEN TO THE WORLD



PUBLISHED DECEMBER 2001

Frequency schedules and broadcaster information as updated by

Teresa Beatrice Abreu, Olle Alm, Jorge Aloy, Rogildo Fontenele Aragão, Herman Boel, Héctor García Bojorge, Ruud Brand, Jordi Brunet, Bryan Clark, Marcelo A. Cornachioni, Svetomir Cuckovic, Alok Dasgupta, Alan Davies, Edward Dunne, Roberto Elizondo, Nicolas Eramo, Bernt Erfjord, Bengt Ericson, David Foster, Yimber Gaviria, Aivars Ginters, Victor Goonetilleke, Keith Gough, Rudolf Walter Grimm, Henrik Hargatai, Wolf Harranth, Stig Hartvig-Nielsen, Karel Honzik, Jose Jacob, Richard Jary, Dave Kenny, Anatoly Klepov, Thord Knutsson, Hans-Joachim Koch, Erik Koie, Tetsuya Kondo, Vashek Korinek, Miroslav Krupieka, Andrejs Kuznecovs, Tore Larsson, Zacharias Liangas, Kai Ludwig, Carlos Maldonado, Bjorn Malm, Ruben Guillermo Margenet, Humberto Molina, Dario Monferini, Winter Monges, Cláudio Rótolo de Moraes, National Radio Club, Inc., Horacio A. Nigro, L Oberto, Paul Ormandy, Alexey Osipov, Rumen Pankov, Anker Petersen, Andy Reid, Mauno Ritola, James Robinson, Rafael Rodríguez, Ibrohim Rustamov, Roberto Scaglione, Djaci Franklin Silva, Arnaldo Slaen, Juan Francisco de la Torre Perez, Bernd Trutenua, Mahendra Vaghjee, Thierry Vignaud, Torgeir Woxen, John Wright, and the WRTH team

plus hour-by-hour guides to international broadcasts in English, French, German & Spanish

72 pages of color — full of reviews, news, and views.

Available at all good bookstores and electronic retailers or contact:
Billboard Books, 770 Broadway,
7th Floor, New York, NY 10003-9595
(www.watsonguptill.com)



Military Technology in the Private Sector

Our lives have been reshaped and enriched by systems that were originally developed for the U.S. military. The Internet, Global Positioning Satellites and Spread Spectrum are all communication systems that have their roots in military technology.

Development of the Internet

In 1957, the USSR launched Sputnik, the first artificial earth satellite. In response, the United States formed the Advanced Research Projects Agency (ARPA) within the Department of Defense (DoD) to develop military science and technology.

The Internet grew out of an experiment begun in the 1960s by the U.S. Department of Defense. The DoD wanted to create a computer network that would continue to function in the event of a disaster, such as a nuclear war. If part of the network were damaged or destroyed, the rest of the system still had to work. That network was ARPANET, which linked U.S. scientific and academic researchers. It began operation in 1970.

It proved that computers can be networked and, in 1972, e-mail was invented to send messages across the network. The first personal computer arrived in 1975. The TCP/IP networking protocol was adopted in 1983 as the Internet standard. The Domain Name System (DNS) was introduced in 1984.

The National Science Foundation (NSF) created NSFNET in 1985 and it was provided free to U.S. research and educational institutions. Sprint and MCI began to build their own networks, which they linked to NSFNET. The National Science Foundation withdrew from the backbone business once commercial firms assumed operation of the major Internet arteries. NSF also coordinated a service called InterNIC, which registered all addresses on the Internet so that data could be routed. This service was later taken over by Network Solutions, Inc.

The World Wide Web (WWW), a web of hypertext documents – within which people communicate with each other and with computers – was developed at a Swiss Physics laboratory in 1991. It contained an address scheme called Universal Resource Locators (URLs) for pointing users to a particular location within the WWW information space. The new WWW information phenomenon was well received and the Internet headed from the university and researchers to the living room. Within a year, a million users had logged on to the Internet.

The White House came on line in 1993 (<http://www.whitehouse.gov/>). That same year, the "Mosaic" web browser – written by a college student – took the Internet by storm. It would lead to the development of the Netscape and Microsoft browsers. The consulting firm Network Solutions was selected by the NSF to register domain names.

Internet phones turned up in 1996 and telecom carriers asked Congress to ban them. It didn't. In 1998, Network Solutions registered its two millionth domain name. By 2000, more than one billion indexable pages are on the Internet. And there are now more than one hundred million Internet users

in the United States. All of this growth took place within a span of only ten years!

Global Positioning System

In the early 1970s, the Defense Department needed a navigational tool that troops on the ground could use to pinpoint their location. The solution they developed required two dozen satellites, atomic clocks, microwave radio transmitters and on board computers. The military called it the Global Positioning System, or GPS, and like the Internet, it was a cold war development that is now used by millions of civilians.

GPS evolved as a solution to problems experienced by the U.S. military forces during the Vietnam conflict – how troops can keep in contact with each other. The NavStar system was developed and GPS became partially operational during the Gulf War in 1990. It became fully operational on June 26, 1993, when the U.S. Air Force completed the network by launching the 24th Navstar satellite into orbit. Civilians were also allowed to use the system.

GPS satellites orbit the earth twice a day, 11,000 miles above the earth, transmitting their precise position and elevation. GPS satellites send out radio signals that a GPS receiver can detect. To calculate the distance from the satellite to the receiver, the system uses a basic high-school math equation: distance is equal to the speed of travel multiplied by the time.

In addition to the time, a signal from a GPS satellite also includes information about the satellite's exact location, which is known, tracked and kept accurate by ground control stations. The time signal is also very accurate, because each satellite contains several atomic clocks. These rely on the oscillation frequencies of atoms to keep time.

The receiver measures the amount of time it takes for the signal to travel from the satellite to the receiver. Since radio signals travel at the speed of light (186,000 miles per second), we can measure the interval between transmission and receipt of the signal to determine the distance between the receiver and the satellite.

Once the receiver has calculated this data for at least three satellites, its location and altitude on the earth's surface can be pin-pointed. The end result is that a GPS receiver can produce highly accurate coordinates of latitude, longitude and altitude.

Commercial software developers can use GPS information to place your location on a graphic map, or even give you turn-by-turn directions to where you want to go. These programs can determine speed and direction from longitude and latitude readings that update every second for display on a road, topographical, or marine map.

Spread Spectrum

One of actress Hedy Lamarr's early husbands (she had six) was an arms manufacturer, and Hedy absorbed an education in munitions manufacturing. Disturbed by his arms sales to the Nazis, she escaped

on a train to London in 1937.

Hedy, once named the "most beautiful woman in the world," knew that guided torpedoes were much more effective at hitting a target. The problem was that radio-controlled torpedoes could easily be jammed by the enemy.

On the eve of World War II, Hedy Lamarr and George Antheil, an American composer, dreamed up an interesting radio guidance device while at a dinner party. Antheil, a pioneer in player pianos, noted that the holes in a piano roll caused the piano to skip from one key to another. Hedy conceived the idea of having a radio guidance frequency do the same thing.

She suggested a "frequency hopping" scheme using two paper piano rolls perforated with identical patterns installed in the submarine transmitter and torpedo receiver. Signals broadcast by the transmitter over quickly changing frequencies would be recognized only by the receiver. She reasoned that this would protect U.S. radio-guided torpedoes from German interception because a constantly changing frequency cannot be jammed.

While they had the foresight to patent their invention in 1942, the patent expired in 1959 without either of them realizing any money from their invention. Although offered to the U.S. military, the invention was not taken seriously and the frequency hopping system was never used during World War II. Digital technology and fast microprocessors had yet to be developed.

In 1960, however, the technology was renamed "spread spectrum" and the military adopted it for secure communications during the Cuban Missile Crisis and in weapon systems during the Gulf War. In 1981, spread spectrum technology was released into public domain.

Commercial interests began using this "new" technology in the 1990s as high-speed digital microprocessors became inexpensive. Spread spectrum has now revolutionized worldwide communications and forms a basic principle that enables simultaneous but private multi-channel operation. Among other things, it is now used in modern digital cellular telephones, pagers and the wireless Internet. Its possibilities are endless.

Spread spectrum is also seen as one answer to the crowded radio spectrum, since different users can use the same band in the same area without interference by changing the spreading formula. Spread spectrum transmits under the noise level without disrupting existing narrow band radio systems.

On March 12, 1997, the Electronic Frontier Foundation (EFF) honored Hedy Lamarr and George Antheil with a special "Pioneer Award" for their "trail-blazing" co-invention of spread-spectrum broadcast communications technologies. "Ironically," EFF said "the tool they developed to defend democracy half a century ago promises to extend democracy in the 21st century." Hedy Lamarr, born Hedwig Kiesler, died in Florida last year at the age of 86.



LETTERS TO THE EDITOR

The more things change, the more they stay the same

In his September *Closing Comments*, Bob Grove asked, "So how does the visitor to a web page know that this is a dealer who can be trusted?" Here's a reply from Bernie Brainerd.

"Ever since long before we were kids, newcomers were free to set up shop, put up a new sign, and open for business. Some succeeded, some didn't. I think those who did succeed were generally adept at their business and honest with their customers. Those who failed were generally inept at business or dishonest. To be sure, some innocent businessmen fell through the cracks because they couldn't adapt to the new competition, but that's always a possibility in the American way of doing business... I don't think it all has to do with profit margins or point-of-sale prices, it has to do with the customer's confidence in that business. If a person shops solely based on bottom line price, then they get what they pay for.

There are businesses I avoid because I don't like their service or attitude. There are also places I shop because they remember my name or face, treat me right, and answer my questions... So how does the visitor to a web page know that this is a dealer who can be trusted? That depends on the visitor. An informed visitor will do a little research... If a visitor to a website isn't willing to be informed, then they get what they deserve.

What do I look for?

- * Years in business, for one. It took me three years to finally buy something from Amazon.com.
- * Personal support, for another. I need a phone number to call and an honest number of hours per day to call that number. If something goes wrong or I need help, I want someone to call.
- * References. Give me some testimonials that don't sound corny. Real names and real experiences please.
- * Location. If you don't have a storefront, tell me. If you do have a storefront, tell me where it is. I may want to visit it.
- * Secure server. Don't make me email my order, but it's ok if you give me the option instead of using a secure server.

Computers vs. radio

A bit on and off the subject: I'm always amused by the various discussions of how computers will change the radio hobby. Computers were a good thing when they made programmable scanners and radios possible. Now computers are coming into question because they may be replacing radio as it has traditionally been.

That's progress, I guess, but things really haven't changed that much. I remember being a kid and driving around the lake and listening to the clear channels like WBZ, WABC, or WLS. There was a strong signal and then there was fading.

Now I can connect through RealAudio and guess what? Net congestion and buffering! Kinda the same thing from a listening standpoint.

Radio is a hobby that has various fascinations to various people. Some people restore old radios, some people crave the state-of-the-art radios. Computers are here to stay, like it or not. But whether one chooses to listen to the BBC on SW or satellite or the internet, who cares? If people are enjoying what they are doing, then they should have every right to do so. On the other hand, few people drive the same car they did 20 years ago, so they shouldn't expect everyone else to do that either."

—Bernie Brainerd

Barrel Capacitors

In the September 2001 article by Mark Colborn, "Following Trunked Radio Systems by Computer," the author stated on page 21 that he replaced R2 in the circuit with a 0.1k barrel capacitor. My question is, where can I find a 0.1k barrel capacitor?

—David Warrick

Mark Colburn replies, "Radio Shack carries them. They are the flat, round, two pinned & yellow colored capacitors.

"Please share with your readers as a follow-up to my article that the BC-780XLT makes an excellent second scanner with Trunker and Etrunker. Plug the 9 pin serial connector wired to the transmit and ground pins in the two level FSK decoder box directly into the rear 9 pin connector on the 780XLT. By holding down the "E" or "REM" key for two seconds the 780XLT goes into the Remote mode even while operating in conventional and trunked modes. When it receives a signal it automatically displays the frequencies appearing on the Trunker/Etrunker program screen. The same batch file parameters for the BC-245 work fine with the 780XLT."

Caddo Parish, LA

"I just read the article 'Scanning the Heart of Dixie' in the November 2001 issue of *MT*. We have a new communication system in Caddo Parish, effective Oct. 15th. Please check out the site at http://signal51group.com/Unipages/radio_freq.htm Thanks for the great magazine."

—Jerry Lindsay

Motorola Trunked System Frequencies

866.1875 866.7750 867.1375 867.7875 868.3375 866.2250
866.7875 867.3000 867.9250 868.3875 866.2875 866.8875
867.4375 868.0875 868.5875 866.4375 867.0500 867.6375
868.1750 868.8125 866.5875 867.0875 867.6750 868.3125
868.8375

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to *Letters to the Editor*, PO Box 98, Brasstown, NC 28902, or email mteditor@grove-ent.com. Letters may be edited for length and clarity. Happy monitoring!

—Rachel Baughn, KE4OPD, editor

Shreveport Fire Department

ID	Division	
8047		8432
8054		8464
8079		8496
8175		8528 Prevention
8240	Main	8560 Maintenance
8241		8562
8242		8592 Academy
8272		8601
8304	Dispatch	8624 EMS
8336	TAC 1	8626
8368	TAC 2	8665
8400	TAC 3	8681
8422		8995
		8995

Note: The S.F.D. dispatch frequency to the fire stations' paging system is 155.94 MHz, but the message is also broadcast on ID 8304.

SFD, EMS & FIRE Dispatch

155.940 Individual or All Call by tones Simplex

Caddo Fire Districts

ID	District		
24240	1	25008	5
24263		25200	6
24272	TAC	25232	TAC
24432	2	25305	
24438		25392	Fire Com
24588		25394	
24624	3	25424	
24728		25484	
24809	4	25496	
24816		25584	8
24848	TAC	25776	9
24864		25808	
24984		25868	
		25904	
		25936	

Performance Upgrades

Kiwa offers performance upgrades to improve the performance of the following receivers:

AOR AR7030
CC Radio
Icom R71 R75
JRC NRD 525 NRD 535 NRD 301A
Lowe HF150 AP/SP150
Radio Shack DX390/392 DX394 DX398
Sangean ATS909 ATS818
Sony ICF2010
Yaesu FRG7 FRG100

Kiwa Electronics

612 South 14th Ave., Yakima WA 98902

509-453-5492 or 1-800-398-1146 (orders)
[kiwa@wolfenet.com](http://www.wolfenet.com)
www.kiwa.com (full catalog)

William Cooper Killed

William Milton Cooper, 58, of Eager, Arizona, was a national leader of the militia movement by virtue of his talk show, "Hour of the Time," broadcast on WWCR out of Nashville. Like some other patriot leaders, Cooper refused to get a driver's license or pay federal income taxes. Cooper was indicted on federal charges of failing to pay taxes from 1992 to 1994, but officers were reluctant to make him a martyr and left him alone, until he threatened a local man with a gun. On November 6, during an attempt to arrest him on a warrant for aggravated assault, Cooper was killed and an Apache County sheriff's deputy was seriously wounded with two shots to the head.

Glenn Jacobs, a newspaper publisher and friend of Cooper, said he didn't think the police operation was unjustified. "I think Bill just went nuts. He was looking for martyrdom anyway and swore he would never surrender."

In an unrelated case, radical Kentucky militia member, Steve Anderson, opened fire at a Bell County, Kentucky, sheriff's deputy during a routine traffic stop near Middlesboro on October 23, hitting the police cruiser repeatedly before escaping into the woods. Anderson, who operated the clandestine United Patriot Radio, has not been apprehended.

E-911 Behind Schedule

Although the predicted stampede to cellular phones did not occur following the World Trade Tower attacks, the growth in number of cell phone users continued to rise within a declining economy. A good portion of new users say they are buying the phones for security, especially when away from home.

When emergencies happen, 911 is the number most folks call. However, when you reach dispatch from a cellular phone, you have no idea where the answering dispatch is and they don't know where you are. That was supposed to change October 1, 2001 – the deadline to start the implementation of Phase II of E-911 requiring Automatic Location Identification (ALI). (See related feature story.)

Instead, a flurry of appeals for extensions forced the Federal Communications Commission to modify the deadline. Rather than extend the 5-year deadline, the FCC is formulating a schedule for progress reports on a case-by-case basis depending on degree of preparedness and merit of the appeal. The FCC has already ruled on schedules for compliance for five of the six largest nationwide carriers; the mid and small-sized carriers had until the end of November to submit their extension requests.

Numerous groups have expressed their concerns that the tracking information be safeguarded so that persons with a need to protect their location, such as battered wives,

cannot be tracked, and consumers are protected against nuisance advertising calls by nearby companies.

Fight for Spectrum Space Heats Up

Congress had mandated that spectrum was to be freed up by Sept 30, 2002, for use by advanced mobile wireless services (3G), but the Bush administration would like to extend that deadline for another two years to allow further study. The frequencies are expected to come from the government sector, but the military is fighting to keep what it already has. Defense Secretary Donald Rumsfeld told a House committee, "In Kosovo, we had one-tenth the number of people that we did in the Gulf War, and we used 100 times the bandwidth." The spectrum under consideration for auction is the 1710 - 1755 MHz and 2110 - 2150 MHz bands, portions of which are used for data links between aircraft and air launched weapons.

FAA Begins Upgrade

In the first phase toward upgrading its communications system, the Federal Aviation Administration awarded a \$20.5 million contract to Indiana-based ITT Industries for a multi-mode VHF digital air-to-ground radio system. The digital radios (called CAVU 2100 meaning "ceiling and visibility unlimited") will employ both 25 kHz and 8.33-kHz double-sidebands. AM is used for analog voice, and VHF Digital Link Mode-3 is used for integrated digital voice and data.

The radios will be available in 2002 for testing, and then will be deployed at 1500 remote air-to-ground and emergency communications facilities serving 21 Air Route Traffic Control Centers. As the Next Generation Communications system is gradually implemented, it will eventually affect all aircraft, but general aviation will probably not need to reequip until 2010 or later.

Merlin Communications Sold

Four years ago, the transmitting business of the BBC World Service was privatized and sold to a group of BBC ex-employees and venture capitalists. The company, Merlin Communications Group, has now been sold to Vosper Thornycroft Holdings PLC (VT) for £95 million – seven times its original cost. VT is a civil and defense contractor focusing on support services, shipbuilding and marine products, with operations in the UK, Europe, United States and Middle East. Merlin will remain an independent subsidiary of the holding company.

Merlin's plans are to grow as a global communications facilities management company. Merlin already has a 10-year contract to operate and maintain the BBC World Service's short and medium-wave transmit-

ters, and is working on a deal to upgrade the transmitter relay station in Oman. It has also signed a five-year contract with the European Space Agency (ESA), to operate and maintain their tracking, telemetry reception and command transmission satellite ground station in Kourou, French Guyana.

All of Africa Now Online

The ITU reports that the year 2000 was a momentous one in the African telecommunications calendar, because that was the year all countries on the continent became connected to the Internet and that sub-Saharan Africa passed the threshold of one telephone subscriber per 100 inhabitants. Within a few years, the report says, it is conceivable that the majority of African citizens will be within range of a mobile signal. Indeed, before the end of 2001, there may be more mobile than fixed subscribers on the whole continent.

WRN Moves to Telstar

World Radio Network has begun digital satellite transmissions in North America on TelStar 5 for its WRN1 English and WRN2 Multi-lingual radio networks. Use of Galaxy

BULLETIN BOARD

January 7: DX Test

KTNS-1090, Oakhurst, CA, DX test 12:00-1:00am PST. KTNS ("Kittens AM 1090") 1000 watts nondirectional. Tones and CW IDs identifying KTNS, along with their regular Music of Your Life (MOYL) format. Reception reports (with return postage) may be sent to: Larry Gamble, General Manager, KTNS-AM, P.O. Box 2020, Oakhurst, CA 93644; E-Mail: mtkaat@sierratel.com; <http://www.KTNSRadio.com> (Arranged by Lynn Hollerman for the IRCA CPC.)

January 12: DX Test

WRCS-970, Ahoskie, NC, DX test 12:00-1:00am EST. 1000 watts nondirectional. Tones and CW IDs identifying WRCS. If any music, it will be gospel music with spoken liners between songs. But the test will consist mostly of CW IDs. Reception reports (with return postage) may be sent to: Bob Carter, Chief Engineer, WRCS-AM, 443 Hwy 42 W, Ahoskie NC 27910; E-Mail: wrcs970am@yahoo.com; <http://www.geocities.com/wrcs970am> (Arranged by Lynn Hollerman for the IRCA CPC.)

January 20: Babylon, New York

Third annual Ham Radio University, 9a.m. at the Babylon Town Hall Annex on Phelps Lane, North Babylon, Long Island. Ham Radio University 2002 is a day of education about Amateur Radio. There will be 20 one-hour presentations with special forums geared to the non-ham as well as the experienced ham radio operator. The focus will be "hands on" with many demonstrations, and a Special Event Station operational on HF.

HRU 2002 is a cooperative effort between over twenty clubs and organizations in the New York City/Long Island area. \$2 donation. For full information check out <http://www.arrlhudson.org/nli/hru2002.htm> or contact: Phil Lewis N2MUN, 631-226-0698 N2MUN@optonline.net

5 will be phased out at the end of 2001 as distribution migrates to the widely used Ku band, DVB standard.

World Space Acquires Voyager

The World Space Corporation has acquired Radio Voyager, an English-language adult contemporary radio network previously owned by Finger Lakes Productions International Inc. Voyager has a network of radio affiliates in European and African markets, and has been part of the WorldSpace broadcast lineup since the company began service with its AfriStar satellite in 1999. Radio Voyager's audio service converges Internet webcasting with traditional radio for global listener reach; it also provides a customized radio streaming service for Fortune 500 corporations.

Satellite TV Rules in Kabul

Before the Taliban banned television, a few Afghan viewers dared to watch the small screen. According to reports, they got their TV from foreign television channels captured via hidden satellite dishes.

As soon as the Taliban left Kabul, movies, music and television re-emerged almost

immediately. Residents soon found out that the only way they can see TV for more than a few hours is through a dish. Kabul's TV station, broadcasting with 30-year-old equipment delivered through a 10-watt transmitter, is on the air about three hours a day.

Radio Free Afghanistan?

The U.S. House of Representatives approved the establishment of "Radio Free Afghanistan" to broadcast news and help explain the United States' war aims to Afghans in their local languages. The Senate has no companion measure, and the Bush administration has not yet weighed in with their support at press time.

Supporters said the broadcasts were needed to get the truth to the Afghan people. "...We are falling behind in the battle for the minds and hearts and souls of the people of Afghanistan," said California Rep. Tom Lantos, member of the House International Relations Committee.

The measure authorizes spending more than \$27 million over the next two years for transmissions into Afghanistan under the auspices of the existing Radio Free Europe/Radio Liberty service. It covers 12 hours of broadcasting into Afghanistan a day and the

\$10 million cost to move three transmitters from the recently closed VOA facility in Spain to Kuwait.

RFE broadcast into Afghanistan during the last half of the Soviet-Afghan war, but ended transmissions shortly after the Soviet Union pulled out of the region. Supporters argued that if the service had been operating in recent years, the followers of Osama bin Laden would not have had such fertile ground in Afghanistan.

The Voice of America has expanded radio broadcasts into Afghanistan since the U.S. military campaign began last month, but some lawmakers have been critical of the service for not advocating the U.S. position forcefully enough.

"Communications" is compiled by editor Rachel Baughn KE4OPD (mteditor@grove-ent.com) from newsclippings contributed by our readers. Thanks to this month's MT reporters: Anonymous, Albany, NY; Jenks Garrett, Weatherford, TX; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI; Robert Thomas, Bridgeport, CT. Via e-mail: Mark Ansel, Roger Cravens, Robert Felton, John Figliozzi, Robert Foxworth, Alan Henney, Maryanne Kehoe, Bob Kozlarek, Ed Muro, Chris Pancheri, Ken Reitz, Doug Smith, Hugh Stegman, Larry Van Horn, Peter Vieth, Robert Wyman, George Zeller

DEDICATED TO THE SCANNING AND SHORTWAVE ENTHUSIAST. WE'RE MORE THAN JUST SOFTWARE!

SCANCAT® GOLD for Windows

Since 1989, The Recognized Leader in Computer Control

Once you use SCANCAT with YOUR radio, you'll NEVER use your radio again WITHOUT SCANCAT!

SCANCAT supports almost ALL computer controlled radios by: AOR, DRAKE, KENWOOD, ICOM, YAESU and JRC (NRD) Plus PRO-2005/6/35/42 (with OS456/535), Lowe HF-150, and Watkins-Johnson.

LIMITED OFFER
FREE
Grove Hot 1000 HF Frequencies
w/Software Purchase

Announcing Scancat-Gold for Windows Version 8.0

We've added a lot of new features to our latest Scancat. AND...We have made it EASIER than EVER!

Scancat-Gold for Windows-New Features for Ver 8.0

- Supports all radios in ONE program - share files with all radios.
- Two Scanning modules:
 - A Simple Basic Module - for beginners
 - An Advanced Scanning System for the "experts".
- New "Folder Tabbed" GUI puts everything at your fingertips

- Faster scanning speeds
- Extensive on screen help
- Completely revised printed manual - Over 160 pgs.
- EXPANDED trunking support for BC780, BC895, BC245 and Pro2052
- Monitor and log all TalkGroup activity - Export to other files.

- Completely revised trunking database management with expanded capabilities. Makes programming your radio a breeze!
- Expanded import from databases such as EXCEL.
- NO ONE supports your "Trunk Tracker" with more features!

Scancat-Gold for Windows-SE - improved Features for Ver 8.0 All the features of our "Standard Scancat" plus these additional functions:

- Long term logging of frequencies to your hard drive.
- Record Audio to hard drive using your computer's soundcard.

- NEW - Records audio when "Trunktracking" or conventional scanning.
- Improved spectrum analysis with several great graphical analysis screens.

STILL THE SAME GREAT PRICE:

Scancat-Gold for Windows\$99.95
Scancat-Gold for Windows-SE\$159.95
Upgrades: Scancat-Gold for Windows\$29.95 + S&H
Scancat-Gold for Windows-SE\$59.95 S&H*
*\$79.95 AFTER 1 YEAR OF PURCHASE
S&H \$5 U.S. \$7.50 FOREIGN

MAGIC for Windows

PUT SOME ORDER IN YOUR LIFE!
If You're Not Using MAGIC,
You're Only Enjoying Half The Hobby.

A Super File Conversion Utility—
Reads & Writes to over 10 database formats.

- Creates databases from plain ASCII text.
- Converts most popular file formats

\$34.95
(plus \$5.00 S & H)

LIMITED TIME OFFER!

Limited Time Thru 2/1/2002

Scancat Gold for Windows\$99.95

Magic for Windows\$34.95

Disk of Frequency Files\$15.00

Regular Price\$149.90

SPECIAL\$124.95

For "SE" Add:\$59.95

"SPECIAL SCGM"

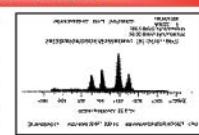
HOKA CODE-3 GOLD

Basic\$425.00

Standard\$595.00

Professional\$795.00

Plus \$10 s&h (\$30 Foreign)



©SCANCAT is a registered trademark of Computer Aided Technologies.

Order direct or
contact your
favorite dealer

FREE FREQ FILES WEBSITE - www.scancat.com E-MAIL - info@scancat.com FREE DEMOS
Phone: (318) 687-4444 FAX: (318) 686-0449 Info/Tech Support: (318) 687-2555 (9 a.m. - 1 p.m. Central M-F)

Toll-Free Orders
888-SCANCAT
888-722-6228

Who's Who in the Radio Spectrum (Part 1)

Your Road Map to the Radio Spectrum

MHz

By Larry Van Horn, N5FPW, MT Staff Journalist/Assistant Editor



It's a day you have been waiting for a long, long time. You have saved your pennies and finally put away enough money to purchase the ultimate experience in the radio hobby. As you watch, the big brown truck pulls up your driveway to deliver the new toy – a wideband general coverage radio from Grove Enterprises.

You hurriedly unpack the radio, set it up on your radio room desk, connect your outside antennas to the rear apron, then you press the power button. You focus immediately on the warm glow of the frequency display. Turning the main tuning dial you watch the numbers on the display change as all sorts of squeals, squeaks, squawks and chirps start coming from the speaker in your new receiver.

There is just one small problem: You really don't know where to tune to hear something intelligible. You suddenly realize that in order to use your new receiver you are going to have to get some sort of guide or radio frequency road map to help you with your journey. You are going to have to learn where and when to tune for what you want to hear.

So, for the beginner as well as the seasoned veteran looking for a new challenge, here is the first in a series of exclusive articles in *Monitoring Times* called *Who's Who in the Radio Spectrum*. This series will look at the radio spectrum from the bottom to the top, showing where various services are located on the radio frequency road map and providing some tips to tuning them in.

Longwave 0-535 kHz

The longwave range – sometimes referred to as “radio’s basement” – occupies the first 500 kilohertz (kHz) of the radio spectrum. Table one outlines some of the basic allocations in this frequency range – except for Mother Nature who

Table One: 0 - 535 kHz

0-25 kHz	Natural Radio (Spherics, Seismic events, and Schumann Resonance/0.2-11 kHz), Caver Communications System, Power Mains (50/60 Hz), Naval/Submarine communications, Standard Time and Frequency Signals (Russian 20 kHz), Radio Navigation (Russian Alpha/Chinese Systems)
25-90 kHz	Fixed stations, Naval/Submarine Communications, US Military Airborne Command Post, Civilian airline crash black box pingers, Standard Frequency and Time Signals (United States WWVB/United Kingdom MSF 60 kHz)
71.6-74.4 kHz	73 kHz Amateur Radio band (U.K.)
90-110 kHz	Navigation Signals (Loran-C)
135.7-137.8 kHz	136 kHz Amateur radio band (CEPT European allocation)
153-279 kHz	Broadcasting in Europe, Africa, Near and Middle East, Asia and Pacific regions
160-190 kHz	1750 meter license-free experimental band (LowFER)
190-280 kHz	Non-Directional Beacons (NDB) for aeronautical navigation (Morse code identifications)
281-325 kHz	Maritime Differential Global Positioning System (DGPS)
325-415 kHz	NDB for aeronautical navigation (Morse code identifications)
415-510 kHz	Ship-to-ship and ship-to-shore (Morse code or CW/SITOR-B modes)
490 kHz and below	Utility-operated power line carrier (PLC) systems
500 kHz	International calling and distress frequency (Morse code)
510-535 kHz	NDB for aeronautical navigation (Morse code identifications)

doesn't need permission to transmit!

Now let's take a closer look at some of the many types of stations we can hear in this portion of the radio spectrum.

Natural Radio

In the basement of the radio spectrum, Mother Nature's radio transmitters reign supreme. Known as natural radio, these signals are electromagnetic energy from natural phenomena. The frequencies are so low, in fact, that if they

were acoustic waves instead of electromagnetic waves, they would be in the range of human hearing. Therefore, receiving natural radio is basically a matter of connecting a suitable antenna to an audio amplifier! Some of these phenomena are not too hard to hear, though it does help to be away from electrical power lines. Some of the most interesting natural radio signals are at a much lower level than power line hum in the typical residential area.

The quickest way to experience natural ra-



A homebuilt natural radio receiver by Chuck Bliley, NY.

dio sounds is to check out Steve McGreevy's sound archive at the University of Iowa (<http://www-pw.physics.uiowa.edu/mcgreevy/>) for recordings in .wav format. A CD of Natural Radio sounds is available for purchase, featuring Steve's recordings at <http://www.triax.com/vlfradio/cd.htm>.

If you would like to explore natural radio first-hand, check out Steve's home page at <http://www.triax.com/vlfradio/natradio.htm> to learn how to get started. This site is one of the best sources of information on the internet on natural radio, with accounts and photos of recent monitoring expeditions, receiver designs, ordering information, and links to other sites.

Utility

The bulk of the signals you will hear below 535 kHz are utility or nonbroadcast transmissions. The U.S. Navy uses the lower portion of this spectrum to transmit messages to submerged submarines. There are several Navy longwave systems used for this purpose. Project Extremely Low Frequencies (ELF) in Michigan transmits extremely slow-speed Morse code (taking up to five minutes to send one letter) on a frequency of 76 Hz (that isn't a misprint). A variety of other frequencies in this range use Minimum Shift Keying (MSK, also known as F1B) form of digital transmission.

The U.S. Navy isn't the only service to use this range. You will also find transmitters from other nations with naval services, including France, Germany, India, Italy, Japan, Russia and many more which use the MSK mode.

Time signals are another staple in the land below 500 kHz. The Russians have long operated a time station network known as Beta in the longwave portion of the band. Look for Beta signals on 20.3, 23.0, 25.0, 25.1, and 25.5 kHz. You will find a very interesting write-up on these Russian stations by one of the deans of the longwave listening world, Trond Jacobsen, at

the following internet URL: <http://www.vlf.it/russianvlf/russianvlf.htm>.

One of the more famous time stations in this frequency range is run by the National Institute of Standards and Technology: station WWVB on 60 kHz near Fort Collins, Colorado. This station produces an effective radiated power output of 50 kW (kilowatts) and can be heard throughout the United States.



WWVB transmits a time signal on 60 kHz

Loran-C

Loran-C was originally developed to provide radio navigation service for United States coastal waters. It was later expanded to include complete coverage of the continental U.S. as well as most of Alaska. Twenty-four U.S. Loran-C stations work in partnership with Canadian and Russian stations to provide coverage in Canadian waters and in the Bering Sea. Loran-C provides better than 0.25 nautical mile, absolute accuracy for suitably equipped users within the published areas. Loran-C signals can be heard on and around 100 kHz.

Broadcast

153 to 279 kHz is used for AM (amplitude modulation) broadcasting in Europe, Asia, the Pacific and parts of Africa. Unlike standard AM broadcast stations in North America that use power outputs up to 50,000 watts, longwave stations are very high power, often running up to two million watts.

On occasion, especially during the North American winter months, these stations are audible in the United States. However, don't expect to hear many English language broadcasts. Like our standard AM broadcast band stations,

these stations are intended for the domestic audiences of the country from which they are broadcasting. Therefore, the only English language broadcasts you are likely to hear in the longwave spectrum are from stations in the United Kingdom on 198 kHz.

LowFERs

LowFER stands for Low Frequency Experimental Radio, which is governed under Part 15 of the Federal Communications Commission (FCC) Rules. FCC Part 15 rules cover both unintentional radiators (devices such as computers and TV receivers, all of which may generate radio signals as a side effect of their operation); and intentional radiators (such as garage door openers, cordless telephones, wireless microphones, etc., which depend on deliberate radio signals to perform their jobs).

It is the intentional radiators which are of interest to us, because we can make them achieve extraordinary results when conditions are right, and some hobbyists enjoy doing just that. Although any type of modulation is permitted which will fit in the 1750 meter band, serious experimenters use Morse Code and other various digital modes for the greatest distance (DX).

You can find out more about LowFER operations on the Longwave Club of America (LWCA) website at: <http://www.lwca.org/part15/whatisit.htm>.

The Longwave Ham Bands

In the spring of 1996, the United Kingdom Radiocommunications Authority allocated 71.6

Longwave Resources

✓ **Sounds of Longwave** 60-minute Audio Cassette featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more! \$11.95 postpaid

✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz. \$11.95 postpaid

Kevin Carey
P.O. Box 56, W. Bloomfield, NY 14585



Professional 10 HOUR RECORDER
"BUILT LIKE A BATTLESHIP"

- Heavy duty commercial recorder - NOT improvised from consumer models
- 12, 14, and 16 hour models also available
- BUILT-IN voice activation (add \$30)
- Applications information included
- Dimensions: 11.5 x 7.0 x 2.75"

SEE US ON THE WEB
www.vikingint.com

Rave Review
Pop Comm
April '96

CODE OK. Calif. residents add tax. Sorry, no credit cards. Free catalog USA only; other countries \$5. Price shipping to all non-business addresses or Imperial orders.

Viking Systems International
100 North Hill Drive #42, Bribens, CA 94005
Factory Direct Phone: (415) 467-1220 Fax: (415) 467-1221
"Since 1971"

\$159

SPECIAL Monitoring Times Price..

FREE
ADVICE
SPECIAL EQUIPMENT
CATALOG

ZWI**178.6 kHz****1750 METER BAND**

Howard "Mort" Mortimer
7614 Homestead Drive, Baldwinsville, NY 13027-9408
(315) 635-5415



ONTARIO

DX

REACHES YOU



ONONDAGA COUNTY USA, Grid FN13
10 Miles NW of Syracuse, NY
This Confirms Your Reception of Lower Beacon
"ZWI" At 178.6 kHz on _____ At _____ UTC.
XMTR- 1 Watt Palomar Ant. 50 ft. Sloper
Thank You For Your Report.

WB2 ZWI

Mort

Date: 3-30-96

A QSL card from LowFER ZWI/178.6 kHz, Baldwinsville, NY

to 76.4 kHz to holders of Class A amateur licenses in the British Isles. Operation is permitted on an experimental, non-interference basis, and is conducted under individual Notices of Variations.

The band was activated, in part, as a stop-gap while the rest of Europe debated other possible amateur allocations in the longwave spectrum.

After 136 kHz was agreed upon, the UK Radiocommunications Authority quit issuing Notices of Variation at the end of June 1998, and operation on this band was supposed to cease two years later. In the spring of 2000, the UK authorities agreed to allow an extension to the cutoff until June 2001. No new Notices of Variation were to be issued, but future discussions about continued use of the band were not ruled out.

Then in the late summer of 2000, word was received that existing Notice of Variations for the 76 kHz ham band were being renewed for three years. By autumn, UK hams received word that some new notices were again being issued.

Early discussions of a possible longwave ham band in Europe included possible allocations around 143 or 147 kHz, but a consensus was eventually achieved for a band at 135.7 to 137.8 kHz. When a working group of the Conference of European Post and Telecommunications (CEPT) issued their report in early 1997, several administrations began rule-making proceedings or issued special permits for use of the band.

A full CEPT recommendation was issued in September 1997, followed by further action in several European nations. On January 30, 1998, the United Kingdom opened the band within its borders, resulting in some of the most prolific activity to date.

You can get much more information on 136 kHz ham band activity worldwide at Dave Pick's (G3YXM) website at <http://www.wireless.org.uk/index.htm>.

In October 1998, the American Radio Relay League (ARRL), amateur radio's national organization in the United States, petitioned the FCC to create two new longwave ham bands at 135.7-137.8 kHz and 160-190 kHz. The League asked for a 200 watt PEP power limit and asked that the new bands be made available to those holding a General or Extra Class license. The League proposed permitting CW, SSB, RTTY/data, and image emissions. The League petition was designated RM-9404. According to a recent ARRL press release in the fall of 2001, League officials anticipate that the FCC will combine three

pending ARRL petitions (including RM-9404) into a single proceeding sometime early this year.

Non-Directional Beacons (NDB)

Most of the low frequency utility stations monitors encounter are nondirectional beacons (also known as NDBs). Many of them were formerly for coastal navigation, but those are generally being decommissioned, or are being replaced with DGPS broadcasts (see below).

Aeronautical beacons remain in common use, and automated voice weather reports are being added at some sites. Most of these low-powered Morse code beacons (identifiers are between one and three characters long) are used for close-in navigation to airports. If you hear a beacon signal that begins with the letter "Y" or starts with a number, you have probably logged a Canadian NDB. These beacons transmit their continuous calls so slowly that even if you don't know code you can understand the letters as they are being transmitted.

Beacon monitors in the United States with internet access will find Paulo Santos' AirNav website at <http://www.airnav.com/> extremely useful in identifying the Morse code identifications they are hearing. European beacon monitors will find a wealth of information including station lists at the *Beacon World* website presented by Alan Gale (G4TMV) at <http://www.alan.gale.clara.co.uk/enter.htm>.

Of course, don't forget to check Kevin Carey's monthly column *Below 500* here in the pages of *Monitoring Times* magazine.

DGPS

The United States Coast Guard operates Differential GPS stations in the 281 to 325 kHz range, often at sites of former maritime NDBs, and now also at some of the former US Air Force Groundwave Emergency Network (GWEN)



LLX/353 kHz, Lyndonville, VT, beacon typical of those used at small private airfields.

sites. These stations transmit correction signals that can be used with special GPS receivers to give domestic users of the Global Positioning System very high positioning accuracy.

To learn more about these stations, what they do, and how to identify them, point your web browser to <http://www.navcen.uscg.gov/dgps/default.htm>. Information on frequency, location, and format of currently operating DGPS stations is available at <http://www.navcen.uscg.gov/dgps/DgpsCompleteConfiguration.htm>. (See also "IDing DGPS Beacon Stations," May 2001 MT-ed) Other nations also operate DGPS services, although not always with the same formats that we use here in the United States.



DGPS site at Pigeon Pt, CA, courtesy DJL

NAVTEX

NAVTEX is an international, automated system for instantly distributing maritime navigational warnings, weather forecasts and warnings, search and rescue notices, and similar information to ships. It has been designated by the International Maritime Organization (IMO) as the primary means for transmitting coastal urgent marine safety information to ships worldwide.

In the United States NAVTEX is broadcast from twelve U.S. Coast Guard facilities on a frequency of 518 kHz using the SITOR-B transmission mode. Coverage is reasonably continuous along the East, West, and Gulf Coasts of the United States, as well as the area around Kodiak, Alaska, Guam, and Puerto Rico. The typical NAVTEX transmission coverage ranges from 200-400 nautical miles.

You will find an extensive list of NAVTEX information at Bill Hepburn's website at: <http://www.iprimus.ca/~hepburnw/dx/navtex.htm>.

Other Sources of Information

If navigational aids, automated weather information, Differential GPS, and similar stations are your cup of tea, you'll especially want to check out all the aforementioned Longwave Club of America has to offer. Their homepage URL is

at: <http://www.lwca.org/>.

Kevin Carey, WB2QMY, our *Below 500* columnist for *Monitoring Times*, has put together an audio cassette tape of the fascinating signals found only on the frequencies between 0 and 500 kHz. Carey's tape includes extensive commentary on the history of these signals, plus tips on listening to these signals yourself. Kevin also provides information on a number of references where you can learn more about listening to the world below 500 kHz.

On this tape you will get details – and audio samples – of many different types of longwave transmissions including: maritime distress, navigation beacons, automated and transcribed weather broadcasts, differential GPS, longwave AM commercial broadcasts, low frequency experimenters band or LowFER, LO-RAN, Omega (no longer on the air), military MSK, the former encrypted "GWEN" system, and time/frequency standard stations.

No self-respecting longwave radio fanatic should be without this resource. Carey's tape can be ordered from: Kevin Carey, P.O. Box 56, West Bloomfield, NY 14585 USA. Cost is US\$11.95, which includes postage to the United States.

Propagation

There are certain advantages to listening to

longwave signals. Since most propagation in this spectrum is by groundwave, fading is either non-existent or very slow (but deep).

There are also disadvantages. The band is extremely noisy with lots of atmospheric noise and static, making it hard at times (especially during the summer months) to pull out intelligible audio from longwave stations. You will also soon discover that other listening patterns exist – winter being better than summer and night better than day.

In order to have distant reception at these frequencies, a darkness path must exist between the receiver and the transmitter. For instance, the best time to listen for European and African signals is around your local sunset here in North America. Asian and Pacific stations are best heard near your local sunrise.

Equipment

So, what equipment are you going to need? First a good, sensitive receiver with product detector circuitry is a must. Most of the shortwave receivers available in the marketplace have coverage which extends down to 100 kHz. These receivers and portables include the AOR AR-3000, Grundig Satellite 800 (portable), Icom R-8500, Palstar R-30, and the Yaesu VR-5000. The Grundig Yachtboy 400 and Sangean ATS-909 portables start their coverage at 160 and 150

kHz respectively. Receivers that start even lower in frequency include the Icom R-75, beginning at 30 kHz, and the AOR AR-5000, JRC NRD-545, and the Drake R-8B communications receivers, at 10 kHz. One other receiver of note for longwave reception is the AOR AR-7030. Its coverage begins at "0" and stops at 32 MHz.

A longwire antenna and good ground is recommended. When picking a receiver for longwave use, you should steer away from the portable radios, since an external antenna cannot be connected to the receiver for longwave or medium wave reception. These radios only use their built-in ferrite loop coils for antennas in these bands.

Finally, your location can play a big part in your success in monitoring this band. Noisy city or suburban locations could pose real problems to hearing signals in the low frequencies. Man-made noise can also be a major obstacle. Even a television set can cause major interference to the weak signals commonly heard in the longwave spectrum.

Longwave may not be the easiest band to DX and it doesn't have a lot of voice signals to monitor, but for those who seek unusual or low-powered listening targets, this is the band to try. Give it a shot if you have the equipment – it can be fun listening to radio's basement frequencies.



The Leader of the Pack...

Arguably the best compact portable on the market! Measuring only 8-1/2" wide and weighing less than two pounds, this dual-conversion, PLL-synthesized receiver stores more than 300 memory frequencies from 150 kHz-30 MHz and FM broadcast! Choose wide or narrow filters to optimize reception, and listen to stereo FM from the headphone jack! A recorder jack allows you to preserve important broadcasts. Digital clock/sleep/timer with alarm shows 42 world cities' times; signal strength indicator assists in tuning. AC or battery powered with battery level indicator for convenience or emergency.

Alphanumeric display aids station recognition, and you can accurately direct-enter frequencies via the keypad, or manually search with the rotary tuning dial. Fine-tune those SSB stations with 40 Hz precision, or let the 909's automatic search feature find the strongest shortwave stations for your listening pleasure! What more could you wish for in an affordable, high performance, world band receiver?

Sangean ATS-909



Grove Enterprises, Inc.
800-438-8155
7540 Highway 64 West
Brasstown, NC 28902
828-837-9200 828-837-2216 (fax)
order@grove-ent.com

**ORDER
TODAY!**

Order RCV08 for only \$ **239⁹⁵**

plus \$7.95 shipping in the US

www.grove-ent.com



Emergency?
Broadcast key details over and over
(WHO • WHERE exactly • WHAT)
without regard for a reply

REACT International, Inc.
Tel. (316)263-2100 • Fax (316)263-2118
P.O. Box 998 • Wichita, KS 67201



Emergency Communications – “Who do you call?”

By Ken Windyka (ken.windyka@the-spa.com)

Today a variety of radio/cellular/PCS wireless services that do not require any license are being purchased by the radio hobbyist and general consumer for the primary purpose of providing a way to obtain emergency assistance when away from home. Ignoring the sales hype, the fact there is such a variety of communications options on the market is a sure sign that none of these is perfect. But which is most reliable for you or for the loved one you want to protect? And, just as important, when you call will anyone be listening?

Cellular/PCS Phones:

There's a wide choice of telecommunications companies, services, and price ranges available for the budget conscious consumer. Check with your local wireless store for specific plans and equipment.

If you plan to take the cell phone on trips, be aware that some companies utilize proprietary networks and have no roaming capability to other systems. Others do offer roaming as long as the remote system allows it.

Dual band phones (digital/analog) are probably the best bet, since analog services have been around longer and therefore have more widespread coverage, and they are more tolerant of interference/low signal strength than digital systems which will drop the signal quicker. However, analog systems do use more radio power, so your portable cell/PCS phone battery could discharge quicker. You might want to investigate the new emergency zinc batteries to keep in the car for emergency; they supposedly stay fresh for years.

You should always check coverage maps, but be aware that even within the primary coverage area there can be many “dead spots.” Coverage is normally reliable on most interstate highways and many major secondary highways.

The national emergency calling number (911) is still to be implemented on cellular systems. Generally, when dialed from a cell phone it will send the caller to a public safety answering point (PSAP). The PSAP may have the capability to transfer the call to the proper jurisdic-

tion or they may have to obtain the necessary information and telephone or radio the appropriate agency for you.

In Phase I of the FCC-mandated implementation, the cellular telephone number of the caller will be displayed on the 911 system. Phase II will provide the caller's actual location (within 100 yards) in relation to the nearest cell/PCS site.

Some states have alternative numbers for highway emergencies. These will normally be posted on signs when you enter the state via the interstate highway system (e.g. in Massachusetts *677 Western MA and *77 for Eastern MA). These answering points do have the capability to transfer calls to appropriate jurisdictions.

You can also do some of your own preparation. In communities that have implemented land line 911 systems, there are alternate emergency numbers listed in phone books which you can program into your cell/PCS phone for emergency services in the jurisdictions you normally travel through.

A strong advantage of cellular/PCS phones (especially in the digital mode) is that conversations are private and cannot be monitored by the average person. Furthermore, when one dials an emergency 911 PSAP there's accountability (e.g. call recorded, dispatch log entry, etc.) from the time the call is received until units arrive on scene.

Cellular/PCS service is not a “sure thing” during an emergency. Sites can be down due to weather, power loss, technical problems, or they may be overburdened with emergency calls from a particular area. Or, the user may be out of range of any cellular/PCS system. The system will either work or not work; there is no in-between option. You can't transmit “in the blind” hoping someone might pick up your signal!

Citizen Band Radio (CB):

The CB radio system on 27 MHz has been around for more than 30 years. That means there's a variety of portable, base, and mobile units, as well as antenna accessories, available at very affordable prices. The units are simple to operate and can take a fair amount of abuse. Portable units are larger than the typical Family

Police aid man in Utah

CONCORD, N.H. (UPI) — By some quirk of nature, New Hampshire state troopers found themselves responding to a report of a fatal accident over the weekend near Green River, Utah.

Ken Windyka of Rochester heard a distress call about the accident over his citizens band radio on channel 9, the national emergency band. He called New Hampshire State Police to report it late Saturday.

“He said a guy needs help on Route 40 about 45 miles west of Green River, Utah,” Cpl. John Healy said Sunday. New Hampshire alerted Utah.

“According to them, our teletype message got to Utah Highway Patrol at about the same time they got a report about the accident. One guy was dead and one was critically injured,” said Healy.

“We just sat here and shook our heads. It's one of those million to one shots,” he said. “That's about the only odds I can lay on it.”

The CB radio frequencies “skipped” or bounced off the atmosphere from Utah, finding their way across the country to Windyka's set, Healy said.

The CB normally picks up signals not more than 20 miles away “on a good day,” Healy said. “And that's at optimum if you're sitting on top of a hill.”



When it's time to call for help, how do you call? Will anyone be listening? (Photo by SLC Sheriff Deputy Marc Peterson KA7SLC)

Radio Service (FRS) equipment.

Communications range (1/2 to 1,000+ miles) can vary greatly depending upon the radio equipment and antenna system, terrain, and atmospheric conditions. For example, radio atmospheric skip can overload the channels with transmissions – but they can also aid in an emergency. (See the article in side bar that I was involved in, with only a portable antenna attached to the back of my base CB radio!) Since the radios have approximately 4 watts of output power, and operate in a simplex mode, CB can be an excellent communications tool in the event of an emergency and the non availability of cellular/PCS phones systems – if you also have an antenna and a power source. Even one-way transmissions “in the blind” may be monitored and acted upon by parties you cannot hear.

The Federal Communications Commission has designated CB Channel 9 (27.065 MHz) as

the official emergency channel. Radio Emergency Associated Communication Teams (REACT International) has response teams in 45 states, District of Columbia, Puerto Rico, Canada (4 provinces), West Indies, and United Kingdom, that are “encouraged” to monitor CB Channel 9 for emergencies (see table for states and number of teams).

Also, state, county, and local government emergency agencies and/or other nongovernment (voluntary) services may monitor Channel 9 either on an official or unofficial basis. However, it should be noted that in some states the Channel 9 program has been eliminated in lieu of cellular/PCS phones (e.g. Massachusetts). Since CB Radios have 40 channels, even if no one is on channel 9, there's a very good chance that someone will be on one of the channels to provide assistance (such as on Channel 19, 27.185 MHz, an unofficial motorist in transit channel).

Family Radio Service (FRS)

The Family Radio Service (462/467 MHz) is a relatively new service that has exploded in popularity among a diverse group of consumers – young, middle-aged, and elderly. There's a very wide range of portable walkie-talkie type equipment available in a price range that just about anyone can afford. Recently, additional base station equipment and mobile equipment models have been introduced to the marketplace as well. Many units have CTCSS/DPL codes to screen out all but desired calls (see table for a complete list of typical CTCSS available in FRS equipment), scan mode (both for finding active channels and codes),



Your cellphone won't help you here if everyone has tied up all available frequencies. (Photo by Garry Watts)

scrambling mode (speech inversion), and a wide variety of other options (e.g. NOAA weather radio, AM/FM radio, stop watch, etc.)

Units have an output of 1/2 watt, and operate on 14 frequencies in the 462/467 MHz range, and the external antennas are limited by regulation. Typical operating range is approximately 3/4 to 1 mile, but the terrain or number of buildings can affect communications distance. For example, someone on a mountaintop might be heard 70 miles away! Their small size and weight makes them very practical for outdoor activities such as hiking, camping, boating, and bike riding, as well as communications between vehicles while in transit. Of course, it can also be used around the house/neighborhood for keeping track of the kids, crime watch, or just chatting with the neighbors.

Although REACT International proposed to equipment manufacturers last year that FRS Channel 1 (462.5625 MHz) with no CTCSS

EQUIPMENT BARGAINS GALORE IN BOB'S BARGAIN BIN!

Grove trade-ins are a **win-win program!** You receive an excellent allowance for your used receiver or scanner, and when you buy a trade-in from Grove, you're assured of a **fully-tested and warranted** radio at a **bargain-basement price!**

Why go through the hassle and delay of trying to sell your radio and buy another all on your own when you can depend on the Grove's **legendary customer service?** We've bought and sold thousands of radios, making us the country's **number one choice for trade-ins!** With such activity, our inventory changes daily, so stop by our web site right now at www.grove-ent.com/hmpgbbb.html, and visit us often!

**Visit our
website
TODAY!**



THE way to stretch your dollar!

GROVE

7540 Highway 64 West

Brasstown, N.C. 28902

800-438-8155 US & Can.

828-837-9200

Fax 828-837-2216

e-mail: order@grove-ent.com

web: www.grove-ent.com

www.grove-ent.com/hmpgbbb.html

*All of our previously-owned equipment is tested and warranted against defects for 90 days.
This list is updated frequently, visit often to catch outstanding bargains!*

code be voluntarily designated as the emergency/calling channel, the industry failed to implement this request. However, since this service has such a very large number of users, there's a strong potential in an emergency for obtaining assistance especially if you are involved in some sort of outdoors recreational emergency (e.g. hiking, boating, etc.). If you are involved in outdoor activities in a particular area (e.g. state/national park, Disneyworld, etc.) you might want to ask the public safety authorities if they monitor a particular FRS channel and utilize any PL code. (If a PL code is used, be sure you check your radio against theirs, since not all PL code numbers correspond with each other.)

Multi-Use Radio Service (MURS)

Multi Use Radio Service is a very recent addition to unlicensed radio services. Presently the FCC has authorized a power output of 2 watts and operation on five VHF high band frequencies in the 151/154 MHz area (see the table for a complete list of current frequencies). There is also a proposal pending with the FCC from one radio manufacturer (that was initially opposed to this service) to add four additional VHF high band frequencies and also add a new UHF band with four frequencies. Unlike FRS, this service does allow base or mobile external antennas.

Since this is a new service, units are relatively high priced (\$100 to \$500 range) but it's expected that prices will fall once the FCC finalizes the overall radio service parameters.

MURS has a very strong emergency assistance potential, particularly for hikers and mountain climbers, because of the propagation characteristics of VHF high band transmissions and the increased power and antenna options. Users of this system should check with appropriate authorities in the area they would be in to see if any of the VHF high band frequencies are monitored.

Marine VHF Radio

For individuals that own boats and regularly use them on large lakes, ocean/bay areas, and large rivers, there's the Marine Radio Service available (156-161 MHz). Overall, these units have declined in price over the last few years, now falling in the \$120 to \$250 range for portable (1 to 5 watts) and mobile or fixed units (25 to 1 watt selectable).

FCC regulations designated marine channel 16 (156.80 MHz) as the distress, safety and calling channel. The US Coast Guard, as well as its auxiliary, monitors this frequency on a continuous basis where they have active units assigned. Range on high-powered models over water can be up to 30 miles (depending upon antenna and weather conditions). However, it should be noted that in some areas the Coast Guard has recommended that cellular/PCS phones also be carried.

Conclusion

No radio or wireless cellular/PCS telephone system is perfect. Ideally, radio hobbyists and "educated" consumers will have more than one communications system with them in event of an emergency, but they should also maintain a

healthy skepticism; *none* of the radio/wireless systems may work in an emergency.

It's vital that proper emergency equipment be carried for whatever activity you are engaged in—driving on rural roads, hiking in dense wooded/isolated areas, traveling for the holidays or on business, etc. These should include spare tire, tire repair kit, basic tools, flares, first aid kit, signaling mirror, proper footwear/clothing, rain gear, protective emergency blanket, water, etc.

Also, it's very important to leave word with someone about what communications equipment

you are carrying with you and what frequency you will be monitoring. Many public safety agencies have helicopters/aircraft that have the ability to monitor and respond to calls for assistance while flying overhead *if* they know what frequency to monitor. Moreover, scanner hobbyists should consider monitoring the most common emergency frequencies for potential calls. When someone calls for help the only one listening may be you.

(See the related guest editorial on page 92.)

REACT EMERGENCY MONITORING TEAMS

Alabama:	2
Alaska:	1
Arizona:	3
Arkansas:	None
California:	37
Colorado:	1
Connecticut:	1
Delaware:	None
District of Columbia:	1
Florida:	12
Georgia:	3
Hawaii:	1
Idaho:	1
Illinois:	15
Indiana:	14
Iowa:	4
Kansas:	2
Kentucky:	6
Louisiana:	None
Maine:	1
Maryland:	10
Massachusetts:	1
Michigan:	7
Minnesota:	5
Mississippi:	None
Missouri:	3
Montana:	1
Nebraska:	7
Nevada:	1
New Hampshire:	3
New Jersey:	9
New Mexico:	1
New York:	19
North Carolina:	14
North Dakota:	3
Ohio:	23
Oklahoma:	4
Oregon:	1
Pennsylvania:	17
Puerto Rico:	2
Rhode Island:	2
South Carolina:	3
South Dakota:	1
Tennessee:	4
Texas:	13
Utah:	1
Vermont:	1
Virginia:	13
Washington:	9
West Virginia:	3
Wisconsin:	8
Wyoming:	None

OTHERS:

Canada: Alberta (1), New Brunswick (1), Ontario (11), Prince Edward Island (1) Germany (1), West Indies (Trinidad T-bago (8)), United Kingdom (1).

FAMILY RADIO SERVICE CHANNELS/FREQUENCIES (in megahertz)

462.5625
462.5875
462.6125
462.6375
462.6625
462.6875
462.7125
467.5625
457.5875
467.6125
467.6375
467.6625
467.6875
467.7125

FAMILY RADIO SERVICE TYPICAL CTCSS SUBAUDIBLE TONES (in Hertz)

1	67.0	20	131.8
2	71.9	21	136.5
3	74.4	22	141.3
4	77.0	23	146.2
5	79.7	24	151.4
6	82.5	25	156.7
7	85.4	26	162.2
8	88.5	27	167.9
9	91.5	28	173.8
10	94.8	29	179.9
11	97.4	30	186.2
12	100.0	31	192.8
13	103.5	32	203.5
14	107.2	33	210.7
15	110.9	34	218.1
16	114.8	35	225.7
17	118.8	36	233.6
18	123.0	37	241.8
19	127.3	38	250.3

MULTI USE RADIO SERVICE FREQUENCIES (no current channel designations)

151.820
151.880
151.940
154.570
154.600

ARTICLE REFERENCE SOURCES:

- <http://www.provide.net/~prsg/>
- <http://www.911dispatch.com/>
- <http://www.state.ma.us/msp/spdepts.htm>
- <http://www.apcointl.org/>
- <http://www.fcc.gov/e911/>
- <http://members.tripod.com/~jwilkers/frspage.html>
- <http://www.reactintl.org/>

SKY WARS

Satellite radio begins with a battle for your car radio in troubled times

By Ken Reitz

When you think of auspicious broadcast debuts, the beginnings of AM and FM radio come to mind. Though separated by decades, each had a profound impact on the way Americans listened to their radios. When AM began a large percentage of listeners built their own radios to tune in. With the dawn of FM radio came the concept of *high fidelity* and eventually *stereo* broadcasts. Now comes what the FCC calls the Digital Audio Radio Service (DARS) in which hundreds of digitally transmitted channels are broadcast direct from geostationary orbiting satellites to specially equipped radios in listeners' cars. Will this be the "radio revolution" predicted by those who stand to profit by its success? Or will it simply be another electronic gadget taking its place in an ever lengthening line of such devices?

The two companies awarded licenses to broadcast in the DARS call it simply "Satellite Radio." Sirius Satellite Radio (formerly CD Radio) and XM Satellite Radio (originally a division of American Mobile Radio Corp.) won the DARS lottery when the FCC asked for applications in 1992 and only four com-

panies came forward. The Commission's plan was to award two licenses to the highest bidders in the hopes of developing a competitive atmosphere from the beginning. In April of 1997 the awards were issued and the flurry of press releases began.

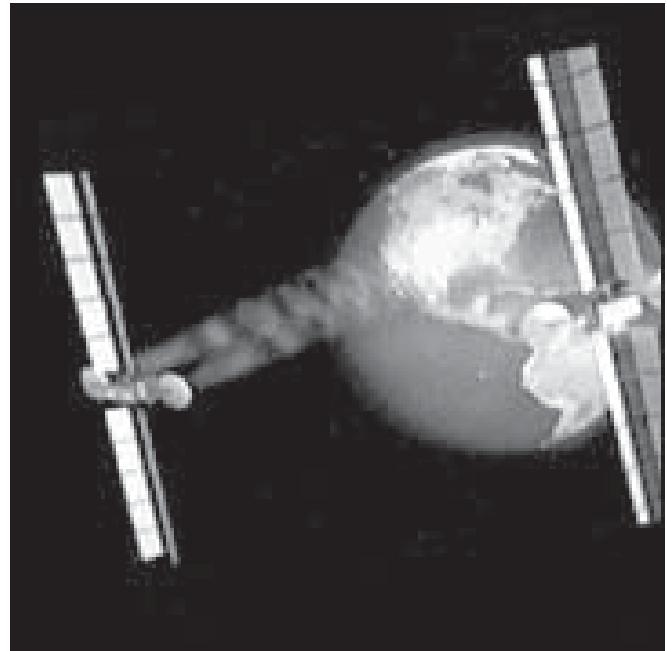
The first four years were spent in a relentless effort to whet the consumer appetite by declaring that service was just a few months or half year away at worst. After considerable setbacks and delays, XM Satellite Radio actually made it on the air at the end of this past September. The final delay came when the original debut of September 12 was rescheduled following the 9/11 attacks in New York and Washington, D.C. And, as if an omen of things to come,

XM was forced to announce just two days after its official debut that Boeing, the company which made both its 702 series satellites, warned them that those particular satellites had a malfunction in the solar array which could eventually reduce output power and shorten the life of the satellites. While XM did make it on the air, Sirius Satellite Radio has been dogged by technical and legal delays which have resulted in an as yet unannounced broadcast debut.

The cheery economic conditions of the late '90s, when Satellite Radio plans began, have deteriorated to the extent that now even Wall Street is having second thoughts. Last year analysts set a target price for shares of Sirius Satellite Radio to hit \$54 per share. That's been knocked down to \$20 per share. XM has similarly suffered, watching its target price tumble



From digital state-of-the-art studios in Washington, D.C., XM Satellite Radio pioneers a new concept in radio broadcasting. (Courtesy: XM Satellite Radio)



Programming on 100 digital audio channels is beamed to XM's two satellites: "Rock" at 115° W and "Roll" 85° W from their own up-link facilities. (Courtesy: XM Satellite Radio)

from \$49 to \$19. As of this writing shares for both hover around the \$6-7 range. Meanwhile, several class action law suits have been filed on behalf of Sirius stock purchasers who allege that the company's rosy predictions were misleading. Sirius says the suits are without merit. Merit or not, the crumbling facade on Sirius' corporate face has forced CEO David Margolese to step down in favor of taking a lower profile position in the company.

One of the things making potential investors shy is that, contrary to earlier "pep rally-style" press releases, Satellite Radio appears to be a money sink at a time when stoppers are in short supply. According to a report in the *L.A. Times*, XM has spent over \$1 billion dollars so far and *The Washington Post* reports that XM must raise an additional \$200 million by the end of this year. That,



coupled with downwardly revised estimates as to the number of subscribers expected to be signed up at the end of the first year, have kept the stock from bucking the general downward market trend.

As bad as the financial problems are for XM things are decidedly worse for Sirius. Even though all its satellites are currently in orbit; its studios, uplink facilities, and staff in place; Sirius finds itself essentially without a product on offer. As the months slip by XM gets all the glory while Sirius has to sit on its hands. Even so, Sirius has seen fit to actually raise its subscription fee. When (or if) Sirius services do commence, customers will have to pay \$13/month for the service as opposed to \$10/month for XM. However, given the nature of satellite delivered entertainment in general, and given XM's financial condition in particular, it's clearly only a matter of time before they, too, announce their first rate hike.

To add to the mayhem, traditional terrestrial broadcast interests have kept up a steady barrage of regulatory sniping from the sidelines. Fearing further erosion of listeners in local markets, the National Association of Broadcasters has fought the establishment of a vast terrestrial network of Satellite Radio repeaters needed to "fill in" the reception gaps which can occur when large buildings, landscapes, tunnels and the like block direct satellite reception. Last fall the Commission allowed operation of a temporary repeater system in return for Satellite Radio broadcasters' promise that they won't begin local program origination to compete directly with local broadcasters.

The NAB's fears are not unfounded. It's not hard to imagine XM buying out Sirius at a fire sale price and, claiming they're the only competition to increasingly monopolized local markets, hitting up a *laissez faire* FCC for permission to begin local program origination.

Satellite Radio Programming

XM is offering 100 channels of digital audio services ranging from music to "talk radio," and, while you might think that for \$10/month you'd be buying a refuge from announcers and commercials, you aren't. All channels have announcers and most are commercially supported.

Channels are categorized as Decades, Country, Hits, Rock, Urban, Jazz & Blues, Dance, Latin, World, Classical, Kids, News, Sports, Comedy, and Variety. Most categories are self-explanatory. There are six "Decades" featuring the music from the '40s to the '90s. "Hits" include a wide range of music from the Top-20 countdown (Top 20 on 20) to adult contemporary hits with a Christian message (The Fish). There are five channels for Hispanics, including "Music from the Caribbean"; seven chan-



nels of World music, and four Classical music channels.

News programming is mostly limited to the audio from standard cable-TV news channels such as CNN Headline News, FOX News, CNBC, CNNfn, Bloomberg News, C-SPAN Radio, and CNet Radio. The only full service international news channel will be a retransmission of the BBC World Service.

Sports channels include ESPN Radio, NASCAR Radio, and CNN/SI, among five. All-talk programming is listed under Variety, which includes "BabbleOn" – which they say is "talk and irreverence for the young and restless," and "FamilyTalk" – "straight talk and faith-based guidance."

Sirius Satellite Radio plans to offer a similar line-up of categories featuring News which will include CNBC, Bloomberg, NPR, BBC World Service, C-SPAN Radio, and World Radio Network. Sports and Entertainment are the other "talk radio" formats. Music formats include Latin (five channels), Rock (six channels), Jazz (three channels), Hits (seven channels), R&B (six channels), Popular (three channels), Country (five channels, including Bluegrass), Classical (three channels) and Eclectica, which includes New Age, Kids, Christian Hits, World, Dance, Blues and Specials. While Sirius plans to have its 50 music channels commercial-free, the other 50 channels will be commercially supported. They also plan to have announcers on the 50 music channels and retain the option to add commercials if the revenue stream isn't as strong as they hope.

The big news for shortwave radio listeners is the chance to catch the BBC World Service on either of the Satellite Radio systems and to listen to World Radio Network's line-up of various international shortwave broadcasters currently available on some cable-TV systems and all C-band satellite TV systems. WRN will be available only on Sirius Satellite Radio.

Programming presents another place to speculate on the future of Satellite Radio. If XM were to buy out Sirius it would have an additional 100 channels to play with. That's more than enough room to provide local origination for the top 50 U.S. radio markets and still have 50 more channels to offer more niche programming. Again, the blueprint for this comes directly from DISH TV network, whose current bid to buy out DirecTV will allow them to add another 25 cities to their already growing line-up of local stations to offer in those markets. Of course, the additional channels and services will entitle the winner to healthy rate increases.

Judging from their earlier comatose response to similar rises in cable and satellite-TV rates, Satellite Radio needn't worry about objections from the Commission, though ob-

jections from consumer advocate groups will prove embarrassing.

What You'll Need to Tune In

Learning from their earlier quagmire with DBS satellite TV, the FCC, from the beginning, mandated that reception equipment for both Satellite Radio licensees be compatible. This eliminated the need for a marketplace technology shootout and almost anticipates the demise of one or the other licensee.

Designing and building the hardware to tune in Satellite Radio has worked fairly well for XM Satellite Radio. They entered into agreements early on to develop and produce the receiving equipment needed to listen to Sat-

ALPINE



Pioneer



SONY



Car tunes never sounded better. Alpine, Pioneer and Sony are just three manufacturers of Satellite Radio receivers. (Courtesy: XM Satellite Radio)

elite Radio with all the big consumer electronics manufacturers. The result is that there are quite a few models to choose from. XM has a catalog of receivers and manufacturer's suggested retail prices on their website, though they don't sell the units (see list of retailers). They also list "Estimated Street Price" which will give consumers an idea about how much all this music and entertainment will cost. A check with any of the retailers listed will show how realistic that price is.

There are several ways to tune into XM in your car. One is to use your existing car stereo and a cassette adaptor or an FM modulator. Another is to get a special AM/FM/SAT in-dash receiver and separate speakers for the full XM effect. Using your existing stereo will be cheaper, but may not sound as good as a whole new car stereo system. Depending on which you choose, you may have to buy the Satellite Radio antenna separately, which will add another \$100 to the cost. The tuner module such as the Sony DRN-XM01C complete costs about \$300 and uses your existing car stereo. An AM/FM/SAT receiver such as the Pioneer XM Radio Head Unit and Receiver Combo will cost about \$400.

Factory installed Delphi-Delco XM radios are currently offered in Cadillac DeVille and Seville models and will be expanded to 20 other GM models in the coming year which mostly reflects the financial stake General Motors has in XM radio. Sirius has made similar arrangements with high-end autos such as Jaguar, BMW and Porsche, which might reflect their initial lack of penetration in mass market car sales.

It's also here, in the hardware department, that the NAB's fears appear warranted. Sony has just released a Satellite Radio receiver for

car and *home*. The Sony DRN-XM01R features a Satellite Radio tuner, FM modulator, antenna, wireless remote, and "docking station" for your car for \$400. For another \$150 you get the Sony DRN-XM01HK which is a "home kit" allowing you to take your Satellite Radio tuner out of your car, bring it into the house and, using the AUX or Tape inputs, play the tuner through your home stereo. A separate Satellite Radio antenna is included. Already there are accessories available such as the Truck Mirror Mount for the XM antenna to connect to your truck or RV.

Looking Ahead

There can be no doubt that prices on all Satellite Radio hardware will decline as the volume of sales increase. Following the DBS satellite TV model, don't be surprised to see these units given away as premiums for purchasing high end car audio systems or high end home stereo systems.

By the end of this year it will be only too clear whether or not the billion dollar Satellite Radio gamble has even a chance of paying off. As with the DBS satellite TV model, the money is in the monthly subscriptions. That's why, after the initial fad has subsided, the emphasis will be on generating the kind of numbers that make investors happy. That means giving the systems away, if necessary, to achieve those sign-up numbers. Following the trend in the DBS satellite TV industry, one of the biggest problems XM and Sirius may have to contend with is "churn", those subscribers who take advantage of introductory offers but fail to become long term subscribers. And, in times of uncertain economics, how will consumers react

to the kind of price hikes typically seen in the cable and satellite TV market? If they're attracted at \$10/month will they flinch at \$15/month or \$20/month?

The Iridium satellite telephone debacle; saturation of the cell phone market; collapse of the PC market; and contraction of the satellite TV market have given us interesting models of electro-communications gadgetry to study. The introduction of Satellite Radio raises important questions and it will be interesting to see how the future of Satellite Radio plays out. Will Satellite Radio have, as its predecessors did, a profound impact on the way Americans listen to the radio? In the car our "AM and FM" buttons are free and they are indispensable. Will we feel the same about the "SAT" button with its monthly bill which arrives with the gas, electric, credit card, ISP, cable-TV, mortgage, heating, home security and trash collection bills?

Satellite Radio Sources:

Sirius Satellite Radio www.siriusradio.com
1221 Avenue of the Americas, New York, NY
10020 Phone: 212-584-5100
XM Satellite Radio www.xmradio.com 1500
Eckington Place N.E., Washington, DC 20002
Phone: 202-380-4000

Retailers carrying Satellite Radio receivers:

Best Buy, Circuit City, Tweeter, Crutchfield, Good Guys, CarToys, Audio Express, Sound Advice and participating Radio Shack dealers and franchisees.

Readers Respond:

"I am very impressed with your magazine. It has a great cross-section of articles and they are quite level-headed."

"Keep up the great work. I am sure I will be subscribing for a long time to come."

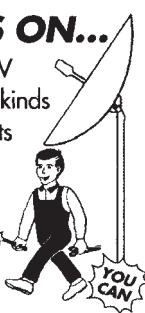
- Al, Milford, PA

KEEP YOUR C-BAND SYSTEM RUNNING STRONG!

Free Buyer's Guide

BEST VALUES ON...

- Receivers, including 4DTV
- Dish Movers & LNBs, all kinds
- Tune-up Kits, Tools & Parts
- Skypac® Programming
- Toll Free Technical Help

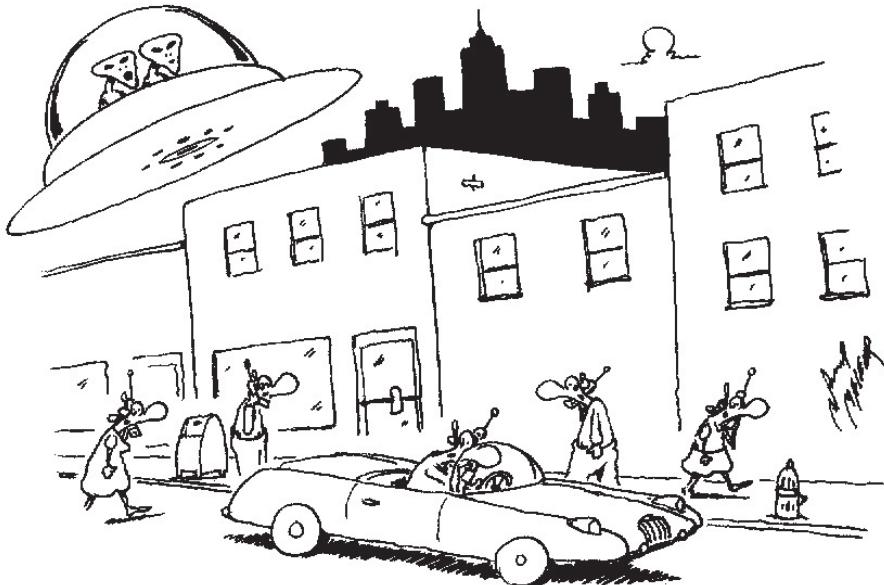


1010 Frontier Dr.
Fergus Falls, MN 56537
Fax: 218-739-4879
Int'l: 218-739-5231

800-543-3025
www.skyvision.com

 **Skyvision**

"THEY SEEM TOTALLY PREOCCUPIED, BARZOK. I RECOMMEND WE START THE INVASION."





Radio Prague- 65 Years of Dedication

By Bill Bergadano, KA2EMZ

It was late afternoon on a frigid Sunday in January 1975. Lunch had been eaten, and it was time to get back to that still brand-new shortwave radio which I had received as a Christmas gift less than a month earlier. The world was coming into my bedroom! I had "traveled" the globe, hopping off to Australia, Ecuador, England; but try as I might, one nation eluded me – Czechoslovakia. I had read about Radio Prague, its external service, but I couldn't find it (blasted analog tuning!).

Thus began the adventures, which would find me, nearly 27 years later, re-living each day of an enjoyable hobby. Moreover, I clearly remember that cold Sunday, when on 1990 kHz I finally heard that station that eluded me. I finally heard Radio Prague!

The Early Years

Radio Prague was first heard at 0830 UTC, August 31, 1936, as storm clouds gathered on the European continent and Adolph Hitler began to test his power. Although ostensibly created for the more than 2 million Czech and Slovak citizens, the broadcaster's unstated purpose was to inform the world about Czechoslovakia.

Back in 1924, when the Prague-based Radio Journal Broadcasting Company began to air music programs in both English and Esperanto on the frequency of 815 kHz, there were few stations on that part of the radio dial, so long distance reception was possible at night throughout Europe, even on mediumwave. When a 5kW transmitter was inaugurated on 815 kHz in 1926, it was one of the most powerful transmitters in Europe. The new transmitter even sent Prague's programming – music concerts for the most part –

into the ears of North Americans! Its 815 kHz signal was heard quite well across the Atlantic.

As 1936 went on, Radio Journal found itself airing weekly foreign language programs about Czechoslovakia on its shortwave station. Though mainly intended for European audiences, radio signals know no bounds, and the station and the nation of Czechoslovakia was becoming better known to foreign listeners.

What's in a name?

It was affectionately called, "Elektra" – a

transmitter operated by a Prague maker of light bulbs. Later, it was known as "Tesla." By whatever name, the new shortwave transmitter set the stage for future years. The firm's engineers had virtually no idea that the transmitter that could go from 10 to 50kW was able to reach the British Isles on the new medium of shortwave, since up to then, Prague had only been on 815 kHz with good results ... but shortwave? It was literally untested; in fact, in those days, it was considered useless and only good for experimenters and radio amateur operators. However,



The English-Language Staff. Standing, left to right: Daniela Lazarova, Ita Dungan, Pavla Navaratilova, Peter Smith, Dita Asiedu, Olga Szantova, Vladimir Tax, Alena Skodova. Kneeling: Bill Bathurst, Rob Cameron, Nick Carey.



Mr. Miraslov Krupicka, Director, Radio Prague

in 1934, as war clouds swirled above Europe, it was hoped that shortwave might be a valuable aid to the nation. A decision that year brought the funds needed to construct a transmitter in Podebrady; two years later, the site was ready for test transmissions with the power near 30 kilowatts.

The first test transmission was made in the evening hours of July 24 into the early hours of the following morning, and then again on August 13 to the 14th. The second test lasted 24 hours with no breaks; gramophone recordings alternated with foreign language announcements made especially for the broadcast. Radio Prague was born.

Learning to walk

In 1937, the radio service from Prague had been split into three different groups for the geographic areas served: the Americas, the Orient, and Europe. The station was on the air approximately 4 hours a day, with few changes from the 1936 format. Languages were added to the output: Spanish, Portuguese, Serbian and Italian. Occasional output in Romanian, Bulgarian, Dutch, Swedish were also on the broadcast menu.

However, 1938 saw Radio Prague responding to events in nearby Germany and the impact that Hitler was having across Europe. From January to June, 8.5 hours of output grew to 22 hours a day during the Munich crisis; from then until March 15, 1939; Radio Prague remained on the air 19 hours a day.

The Nazi occupation during World War II would see an end to independent Czechoslovakia and "free" broadcasts from Radio Prague; however, even though 3 hours a day was allotted for expatriates now in North America, Radio Prague would remain silent for six years.

Welcome Back?

"Calling All Czechs." These were the first words spoken on the revived Radio Prague as part of an anti-Nazi uprising on May 5, 1945. External services resumed with depleted technical resources and a severe shortage of skilled

linguists. Still, Radio Prague found the ability to once again inform the world about the nation. The first transmissions were beamed to Eastern Europe and consisted of eight languages, including Russian, plus transmissions worldwide for Czech and Slovak expatriates. By the end of 1947, German was added; in 1948, Greek was also added. However, budgetary problems forced the station to reduce output in the newly added languages from 30 minutes to 15. Still, Radio Prague was reaching the corners of the globe, telling the listener of the Marshall Plan to rebuild Europe.

The year 1948 also brought a Communist coup, which created Czechoslovak Radio on April 28. Radio Prague rather unofficially divided its broadcasts between "capitalist nations" and "friendly nations" (i.e., the Soviet Union). The listener in the capitalist world would be told of how wonderful the communist system was, as Radio Prague became a mouthpiece for Moscow. However, at one point, these programs were cancelled for a Soviet-led program exchange more suited to Moscow's tastes.

This ideology would continue for many years; in 1952, only 7 years after the end of a World War, Czechoslovakia continued under Soviet tyranny. A reorganization of Czechoslovak Radio gave Radio Prague the role of an autonomous voice, to build the international image of Prague. However, such changes did not go without paying a price. Many staff members were sacked without warning overnight, with quite a few becoming victims of the Communist regime "sham" trials.

Programs sang praises to the Communist way of life. More languages, including Swahili, were added. Radio Prague was finding itself on the front lines of the cold war: Listeners in the emerging African and Asian nations were to be lured to Communism by being told of the system's advantages, while listeners in regions like North America were given a large amount of propaganda. The impact of the cold war on international radio was obvious. Four more languages were added, including Italian. Radio Prague was able to rely on the services of American citizens turned off by U.S. Senator Joseph McCarthy.

Radio Prague was growing in popularity, no matter the type of broadcast. While no exact records exist, the station received in 1957 some 25,000 letters: 36,400 in 1959, and more than double that amount when over 100,000 were re-

ceived in 1965. During the Cuban missile crisis of 1961, Radio Prague's Spanish service aired many hours of live programming each day.

1968

In 1968, I was 10 years old and was enjoying watching and rooting for Al Kaline and the Detroit Tigers on TV that summer, cheering for Denny McLain to win 30 games. My peers in Czechoslovakia, along with everyone else in that nation, had something that didn't make them cheer: at 1:30am on August 21, the world was informed by Radio Prague of the invading Warsaw Pact troops. At 4 a.m., a statement was read by the Czech Communist Party; "...this is happening without our knowledge and against our will..." The national anthem was aired during a scheduled noon news bulletin; however, the bulletin was interrupted by rapid submachine gun fire!

Radio Prague and Czechoslovak Radio workers at 12 Vinohradská Street found that the broadcast center had become a battlefield. Twenty people were killed. The next day, a clandestine Radio Prague transmitted from a home in the southeast Prague; it condemned the Warsaw Pact invasion. Soon the nation went "back to normal"; many of the staff who were not able to flee to the West in time were sacked and banned from working in the media.

The Later Years

1989. The year saw many changes to Czechoslovakia: the Iron Curtain fell, and democracy returned to the country in November

New books and CDs for worldwide radio! HF E-mail radionets and digital data decoding

2002 SUPER FREQUENCY LIST CD-ROM

all broadcast and utility radio stations worldwide!

10,100 entries with latest schedules of all clandestine, domestic and international broadcasters on shortwave. 9,900 frequencies from our 2002 Utility Radio Guide. 18,800 formerly active frequencies. All on one CD-ROM for PCs with Windows™. You can search for specific frequencies, countries, stations, languages, call signs, and times, and browse through all that data within milliseconds. It can't get faster and easier than this! • \$ 22 (worldwide seamall included)

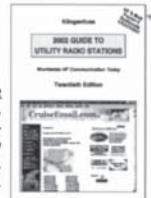


2002 SHORTWAVE FREQUENCY GUIDE

Simply the most up-to-date worldwide radio handbook available today. Really user-friendly and clearly arranged! Contains more than 20,000 entries with all broadcast and utility radio stations worldwide from our 2002 Super Frequency List on CD-ROM, and a unique alphabetical list of broadcast stations. Two handbooks in one - at a sensational low price! 532 pages • \$ 30 (worldwide seamall included)

2002 GUIDE TO UTILITY RADIO STATIONS

Includes many HF E-mail Pactor-2 and GW-Pactor radionets that we cracked! Here are the really fascinating radio services on SW: aero, diplo, maritime, meteo, military, police, press, and telecom. 9,900 up-to-date frequencies from 0 to 30 MHz are listed, plus hundreds of new decoding screenshots, abbreviations, call signs, codes, explanations, meteo/NAVTEX/press schedules, modulation types, all Q and Z codes, and much more! 584 pages • \$ 34 (worldwide seamall included)



Special package price: CD-ROM + Shortwave Frequency Guide = \$ 43. For more package deals and a full list of our products see our website and catalogue: books, CDs, professional frequency databases. WAVECOM Digital Data Decoders = the #1 worldwide: ask for details. Cracks Pactor-2 and its variants, plus 100+ other modes! Sample pages and colour screenshots can be viewed on www.klingenfuss.org. Payment can be made by Eurocard, Mastercard, Visa. No cheques! Please ask for our free catalogue with recommendations from all over the world. We've been leading in this business for 33 years! ©

Klingenfuss Publications • Hagenloher Str. 14 • D-72070 Tuebingen • Germany
Fax +49 7071 600849 • Phone 62830 • klingenfuss@compuserve.com • www.klingenfuss.org



Mr. David Vaughn, Editor-in-Chief

of that year. Radio Prague was reborn, no longer under the cloak of Soviet tyranny as to what to say. The station began again to give the listener worldwide a true picture of the nation and its activities. Returning to its early days, the station revived the signature tune, Dvorak's *New World* Symphony.

Radio Prague saw the need to redesign itself. In early spring of 1990, save for its Czech service, all other services were briefly stopped. On May 7, it returned with only four languages – English, French, Spanish and German. While several languages were dropped, Czech and Slovak reporters were given assignments to put them with expatriates worldwide. The idea worked until Czechoslovakia split into two nations.

In 1995, Radio Prague began broadcasts via satellite to Europe and North America via the World Radio Network in London. In the Czech Republic, listeners can tune in on FM for a 30-minute program in English targeted to speakers of that language in Prague. The previous year saw Radio Prague add its Internet service, which includes a streaming real audio broadcast – bringing the Czech Republic even closer to those having no knowledge of that nation.

A Personal Observation

For over 26 years, I have been tuning into Prague. It is one of the most listener friendly stations on shortwave! At a time when many stations seem to be cutting back on sending out QSLs (verification cards) to listeners – or even deleting them entirely, the QSL service is a mainstay at Radio Prague. The 2001 series of cards includes a picture of a 4-tube radio. Past years have brought to my mailbox many images of the country's landscape depicted on verification cards.

If you want to add Radio Prague to your listening habits, I highly recommend it! The English broadcast schedule will show you the time and frequencies in your area. And don't forget – after you have listened in, drop Radio Prague a note to let them know you heard their broad-

cast. The station accepts email reception reports at cr@radio.ca or by good old snail mail with a simple address of Radio Prague, 120 99 Prague 12, Czech Republic.

About the author:

Bill Bergadano is 43, licensed ham operator KA2EMZ since 1979, and has heard stations from 177 different countries.

Radio Prague: Various Languages

UTC	Language	Targets	kHz
0000-0027	SPANISH	Am	7345 11615
0030-0057	CZECH	Am	7345 11615
0130-0157	SPANISH	Am	6200 7345
0230-0257	CZECH	Am	6200 7345
0300-0327	SPANISH	Am	6200 7345 7385**
0330-0357	CZECH	Am	7345 9435
0500-0527	RUSSIAN	EuAs	6055 11600
0700-0727	FRENCH	Eu	5930 7345
0730-0757	GERMAN	Eu	5930 7345
0830-0857	SPANISH	Eu	11600 15255
0900-0927	FRENCH	Eu	11600 15255
0930-0957	CZECH	EuMEAf	15255 21745
1030-1057	CZECH	AfAs	21745
1100-1127	GERMAN	Eu	7345 9880
1200-1227	CZECH	EuAs	11640 21745
1230-1257	RUSSIAN	EuAs	6055 17495* 21745
1300-1329	GERMAN	Eu	6055 7345
1330-1357	CZECH	Eu	6055 7345
1430-1457	CZECH	AfAm	21745
1500-1527	SPANISH	Eu	11600 13580
1530-1557	RUSSIAN	EuAs	5915* 11975 13580
1600-1627	GERMAN	Eu	5930
1630-1657	RUSSIAN	Eu	5990*
1630-1657	CZECH	EuAf	5930 17485
1730-1757	GERMAN	Eu	5990*
1730-1757	FRENCH	EuAf	5930 17485
1830-1857	CZECH	EuAsAu	5930 7315
1900-1927	SPANISH	Eu	5930 9430
1930-1957	FRENCH	EuAf	5930 9430
2000-2027	SPANISH	Eu	5930 9430
2030-2057	CZECH	EuAsAu	5930 9430
2100-2127	ENGLISH	EuAsAuAm	5930 9430
2130-2157	SPANISH	EuAm	5930 9435
2200-2227	CZECH	EuAm	5930 9435
2300-2327	FRENCH	Am	7345 9435

(Radio Prague via BBC Monitoring)

Radio Prague Daily Program Schedule

Monday

News

Current Affairs

Spotlight / One on One

Tuesday

News

Current Affairs

Talking Point

Wednesday

News

Current Affairs

Czechs in History / Central Europe Today

Thursday

News

Current Affairs

Economic Report

Friday

News

Current Affairs

Magazine

Saturday

News

Readings from Czech literature

Musical Feature (Classical and Ethnic Music alternates with Contemporary and Traditional Jazz)

Sunday

News

A Letter From Prague

The Arts

Mailbox

Radio Prague welcomes all program comments, questions and criticism. It carries out a continuous reception survey and confirms all reception reports by QSL verification cards.

E-mail: english@radio.cz

or via post;

Radio Prague,

English Service

120 99 Prague2,

Czech Republic

Radio Prague's English Schedule

28 October 2001 - 30 March 2002

UTC	kHz	m	kW	Area
0800 - 0827	11600	25	100	N.W. Europe
		15255	19	100
1000 - 1029	21745	13	100/100	S. Asia/W. Africa
1130 - 1157	11640	25	100	N. Europe
		21745	13	E. Africa/Mi. East
1400 - 1429	21745	13	100/100	E. Africa/N. America
1700 - 1727	5930	49	200	N.W. Europe
		17485	16	C.&W. Africa
1800 - 1827	5930	49	200	N.W. Europe
		7315	41	E. Europe/Asia/Australia
2100 - 2127	5930	49	100	N.W. Europe/N. America
		9430	31	S.&E. Asia/Australia
2230 - 2257	7345	41	100	N. America
		9435	31	W. Africa
2330 - 2357	7345	41	100	N. America
		9435	31	100
0100 - 0127	6200	49	100	N. America
		7345	41	100
0200 - 0227	6200	49	100	N. America
		7345	41	100
0400 - 0427	7345	41	100	N. America
		7385**	41	50
		9435	31	100
0430 - 0457	9865	31	100	Mi. East/S.W. Asia
		11600	25	100

Transmitters at Litomysl 16E10 49N48

* Relayed via Rimavská Sobota, Slovakia 20E00

48N23

** Relayed via WRMI Miami, Florida 80W22

25N54

**THE Source for ALL
of your scanner and
accessory needs!**

SCANNERS

UNIDEN

BC780XLT	SCN 49	\$349.95
BC245XLT	SCN 35	\$199.95
BC895XLT	SCN 9	\$194.95

ALINCO

DJ-X2T	SCN 3	\$229.95
DJ-X3T	SCN 11	\$249.95
DJ-X10T	SCN 1	\$349.95
DJ-X2000T	SCN10	\$499.95

AOR

AR8200IIB	SCN 50	\$559.95
AR3000AB-DS	SCN 26	\$1062.95
AR8600	SCN 8	\$899.95

YAESU

VR-500	SCN 6	\$324.95**
--------	-------	------------

ICOM

R10	SCN 4	\$339.95**
R2	SCN 5	\$189.95**
R3	SCN 7	\$499.95**

ANTENNAS & CABLES

Austin Condor	ANT 14	\$29.95
Grove Scanner Beam	ANT 1	\$74.95
800 MHz for handhels	ANT 22	\$29.95
800 MHz for base w/ right-angle conn.	ANT 23	\$34.95
OMNI II Scanner	ANT 5	\$29.95
Professional Wideband Discone	ANT 9	\$99.95
2 1/2" Long Close Range	ANT 18	\$15.95
Scantenna + 50' coax	ANT 7	\$54.95
Stealth Mobile Monitoring	ANT 30	\$34.95
H800 Skymatch Active	ANT 15	\$129.95*
Active Duck	ANT 36	\$39.95
Select-A-Tenna	ANT 21	\$59.95
Super Select-A-Tenna	ANT 40	\$189.95
AOR DA3000 Aerial Discone	ANT 11	\$129.00
AOR MA500 Wide Range	ANT 12	\$99.00
AOR SA7000 super-wide receiving	ANT 39	\$199.95
Range Extending Mobile Mag Mount	ANT 3	\$24.95
WiNRadiO AX-31B Active UHF Ant.	ANT 4	\$119.95
Grove Universal Telescoping Whip	ANT 6	\$19.95
Nil-Jon Super-M Superior Mobile Ant.	ANT 10	\$79.95
Create CLP51301N Log-Periodic Ant.	ANT 16	\$429.95
Create CLP51302N Log-Periodic An.	ANT 17	\$299.95
50' of RG-6U cable	CBL 50	\$19.95*
100' of RG-6U cable	CBL 100	\$24.95*

Grove Enterprises, Inc.

(800) 438-8155; (828) 837-9200

(828) 837-2216 fax

7540 Hwy 64 W; Brasstown, NC 28902

order@grove-ent.com

www.grove-ent.com

**Hop on our website for
up-to-the-minute prices
and products!**

www.grove-ent.com

ACCESSORIES

UNIDEN BC SCANNERS

Computer interface cable for BC895	ACC 15	\$29.95
Scanner Master Reaction Tuner "SMARTLINK"	ACC 22	\$69.95
BP-180 Uniden battery pack	BAT 5	\$19.95
BP120 spare battery & charger	BAT 24	\$25.95
BC235/245 hard leather case	CAS 3	\$29.95
DC cord	DCC 7	\$15.95
Uniden BP1200 Nickel Hydride Batt.	BAT 1	\$29.95
Scanner Master Winscan 245 Software	SFT 1	\$59.95
Scanner Master Winscan 895 Software	SFT 3	\$59.95

ALINCO SCANNERS

EBP-34N Longlife NiCd battery	BAT 21	\$79.95
EBP-37N Standard battery	BAT 21A	\$39.95
EDH-16 battery case, 4 "AA"	BAT 22	\$9.95
DJ-X10T soft case	CAS 19	\$12.95
EDC-36 car lighter cable w/filter	DCC 14	\$23.95

AOR SCANNERS

Extended memory card for AR8200II	ACC 27	\$79.00
AR8200II leather case	CAS 21	\$24.95
AR8200II soft case	CAS 25	\$12.95
Tape recording lead for AR8200II	CBL 7	\$61.00
Computer control lead for AR8200II	CBL 8	\$109.00
AC adaptor for AR8200II	PWR 24	\$21.95
CTCSS squelch & search card	ACC 24	\$96.00
Tone eliminator (256 steps) card	ACC 25	\$58.00
Chip based recording & playback card	ACC 26	\$77.00
Computer Interface Cable for 8200	CBL 13	\$20.00

YAESU SCANNERS

VR-500 cloning software and cable	SFT 25	\$39.95
-----------------------------------	--------	---------

ICOM SCANNERS

R3 battery pack	BAT 4	\$46.95
R2 soft case	CAS 20	\$29.95
R3 leather case	CAS 2	\$19.95
R3 Cigarette Adaptor	DCC 18	\$24.95
R3 drop-in charger	PWR 15	\$69.95
R2 CS-R2 cloning software	SFT 7	\$12.50
R3 software for Windows 95/98	SFT 14	\$19.95
OPC-478 Computer Interface (PC to radio)	ACC 3	\$44.95

MISCELLANEOUS ACCESSORIES

Universal Cigarette Adaptor	DCC 3	\$12.95
GRE Super Amplifier	PRE 1	\$49.95
Scancat Gold for Windows	SFT 2W	\$99.95
Scancat Gold for Windows SE Upgrade	SFT 2SE	\$59.95
Grove FTR-100 Scanner Filter 90-174MHz	FTR 100	\$49.95
PAR VHF Intermod Filter 152MHz	FTR 152	\$69.95
PAR VHF Intermod Filter 158MHz	FTR 158DS	\$69.95
PAR VHF Intermod Filter 462MHz	FTR 462DS	\$69.95
FM Trap Filter 88-108MHz	FTR-FMDS	\$69.95
Professional Mobile Speaker	SPK 1	\$19.95
Drake MS-8 External Speaker	SPK 2	\$48.95

* UPS ground shipping in US included

** Call for special promotional pricing

Prices subject to change without notice

Ken Reitz, KS4ZR

ks4zr@firstva.com

Your Beginner's Questions Answered

Over the last few months there hasn't been enough room in the Beginner's Corner to cover the questions many of you have asked. While I try to answer the questions as quickly as I can when they come in, it takes a while for them to find their way into print. Now let's see what's on our readers' minds.

◆ Antenna Questions

One of the most popular columns was the one which appeared in the October '00 issue of *MT* called "The Only SWL Antenna You'll Ever Need." For six months I was getting questions and reports from readers building, intending to build, or having built the antenna. Since then the CD ROM anthology of *MT* was released and a number of new readers have discovered the plans and now they're doing the same thing. So, for the benefit of everyone who's interested in an easy to build, very effective, all band outdoor antenna here's a brief description (see diagram).

The antenna is an "off-center fed dipole" with one leg of the antenna being 44 feet and the other being 90 feet. It's connected at the "off-center" with a Hy-gain® center insulator #155S. Connected at the center insulator is 48.5 feet of 300 ohm TVM "ribbon wire," the other end of which is connected to the terminals at the top of a 4:1 balun. The bottom of the balun has an SO259 connector which accepts a length

of RG/8m long enough to go to your radio shack and plug into the back of your receiver. The length of this coax cable doesn't matter.

The design is from *MT*'s own Bob Grove and is intended to be a ham radio "all-band tunerless antenna." That means that it operates in the ham bands from 80 meters (3.5 MHz) to 10 meters (29.9 MHz) without requiring the use of an outboard tuner to match the antenna to the transmitter. What that means to SWLers is that it is an antenna which tunes those bands and everything in between with optimal performance, even on the AM band.

One problem readers had was obtaining the particular Hy-gain center insulator for this project. Try ordering direct from Hy-gain (addresses for parts at the bottom of this column). Another question is about the exact dimensions. Since the wire has to be twisted around and through an "egg" insulator at the ends and at the center, should the dimensions be increased to make up for the connections?

Well, even though antenna building requires a certain amount of precision, a couple of inches here or there

won't make any appreciable difference in operation especially if it's used only for receiving. If you were to turn the inches into feet, then it would start to make a difference, but again, only for transmitting, and even then the effect would be minimal.

Another question has to do with antenna law and comes from Richard Schultz. He wrote,

"...Where on the FCC web site should I go to obtain info/rulings on what is allowed in the way of antennas within a condominium complex for receiving satellite, TV, shortwave, etc. transmissions?"

I wrote a feature article in the April, '00 *MT* on "Antenna Law: What you can and can't do" which covers the subject

of antennas in the HF, VHF/UHF, and satellite TV range including the use of external antennas, beams and dishes. The two main locations for information on this subject are found at the American Radio Relay League's site (<http://www.arrl.org>) and at the FCC's Fact Sheet "Over-the-Air Reception Devices Rule" which is found at <http://www.fcc.gov/csb/facts/otard.html>. It's a ten page Q & A from the Commission which is well worth reading.

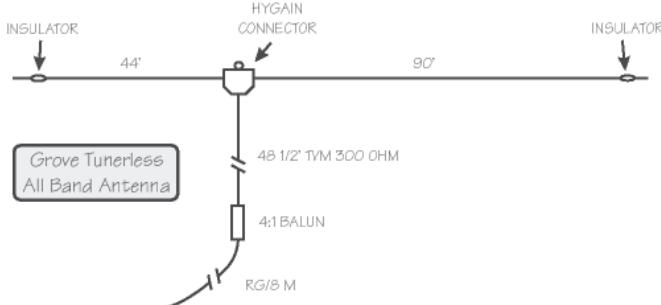
◆ Scanners

Conrad Garcia read "Getting Started in Scanning" (*MT* October, 2001) and was intrigued about the Radio Shack Pro-79 hand-held scanner. "Can you tell me if this scanner is any good? I listen to shortwave but have been considering buying a scanner. Would this be a good beginner scanner...?"

I bought one over a year ago and have to say I've been very satisfied. The main thing, as I said in the article, is to have an idea of what you want to listen to. I find that the Pro-79 tunes everything in my location I want to hear. It has a WX band button which is separate and allows you to monitor your nearest WX radio station. It also has a priority mode with which you can set it up to alert you in the event of impending bad weather. Most local WX radio stations do a test of this system each week so that users can determine if their system is working. I found it works great and really came in useful this summer when we had some very bad storms.

Another question comes from long time *MT* reader Judy May who writes, "I just bought a BC245XLT scanner and am really enjoying it. Years ago a policeman told me that it was against the law to carry a scanner in my car. I think I ran across a reference recently that inferred that getting a ham radio license made one exempt from that law. Is that true? If so, it might just be the push I needed to finally go for it!"

Now, I happen to know that Judy is also a tandem bike enthusiast and I can't resist prodding her toward a ham license. The FCC exam is so simple you can actually memorize enough correct answers to pass; there's no code requirement; there's a terrific ham/bicyclists club (Bicycle Mobile Hams of America); 2 meter rigs are so small and so cheap that their use in summoning help in the event of a bicycle breakdown or accident should make them as indispensable to serious bike riders as a helmet. Well, enough brow-beating!



Laws regarding scanning mobile vary state by state. Check out the *Listening Lawbook* on the *Monitoring Times* website and also <http://www.afn.org/~afn09444/scanlaws/>, which may be a bit more up to date.

◆ Satellite TV Receivers

Chris Singleton, KE3MC, saw my April Beginner's Column of '01 about using an old Primestar dish and LNB with an MPEGII receiver. He writes, "...Is there any way that I could modify the Primestar receiver to work with anything else? I am a 'tinkerer' and would like to experiment with this and am looking for some guidance as to how to get started...I am an Extra Class Ham and an ex-Broadcast Engineer, so I have a strong technical background which could be applied here with some help..."

The Primestar receivers are all essentially junk and there's plenty of them. That means that if you collected as many of them as you could, you could tinker to your heart's delight and not actually ruin anything! The problem, as I see it, is that the essence of the receiver is the software in the chips, and I doubt that it would be worth learning how they work to try to reprogram them for any other purpose. Maybe another *MT* reader has another idea; if so, let's hear it!

The old Primestar dish, on the other hand, is actually still useful since it is a good dish and it uses a standard Ku-band LNB. You can get a nice, functioning, used C/Ku-band receiver for \$25 or less at flea markets, yard sales, ham fests

or the Internet which can be used with the old Primestar dish/LNB to pick up standard Ku-band fare. Typically you'll see news feeds, sports backhauls, and various NTSC, in-the-clear programming such as CCTV's 24/day broadcasts from China. Add an inexpensive MPEGII receiver, such as the ST-7700 reviewed in last month's column, and you can set it up on Telstar 5 for a cornucopia of international broadcasts from all over the world. I always hate to see all those old Primestar systems just sitting in dumpsters all over the country.

Speaking of MPEGII reception, John Stanko writes to let us know of a site he uses to get updated info on MPEGII transmissions. John says, "...go to <http://emantechology.com>...you will see satellite station updates. I have found them to be very accurate and posted very quick. They really watch Telstar 5 action as stations come and go..." Thanks for the tip, John.

◆ Final Wrap-up

Finally, here are some other interesting things readers have written. William Andrade, who is into weird antennas says, "...I live in an apartment on the top (5th) floor and have a 'slinky' helical indoor corner dipole/closed loop. Each segment equals 67 feet flat wire...I have 5 segments in a more or less rectangular closed loop which equals 335 feet. I get excellent reception on 49 m and below...." He also uses a 5-story metal fire-escape for an antenna. "...I wrap

one leg of a capacitor around the bare end of the 50 feet of 14 gauge wire and insert the other capacitor leg into the hi-z post of the R8B [receiver] so as to prevent overloading."

Piran Mohazzabi, AB8HU, writes, "...in reference to your article on Whole House Audio which appeared in March 2001 of *Monitoring Times*...it works great. By a simple modification on the Sound Feeder (FM stereo transmitter)...I managed to get a range of 200 ft...I replaced its 3-inch antenna to a couple of feet telescopic antenna...instead of 1.5 volts I am using 3 volts...you can use 3 feet of wire connected to an alligator clip, then clip to the telescopic antenna of the Sound Feeder." Great tips Piran!

Charley Jackson, N4WJP, from Austin, TX writes, "...I enjoyed your article in November *MT* ("The Best Way to Learn Morse Code") and thought I'd pass along how I learned code. I started with the straight memorization and graduated to WIAW's 5 wpm lessons. I struggled to get to 7.5 wpm and wondered how I would get up to 13. A friend of mine...gave me a suggestion: ...tune into the FAST lessons. Start with 35 wpm, even if all you're able to do is copy T's and E's. As the lessons wind down you'll find that 15 wpm sounds really slow. Obviously, it still takes a little time to get comfortable with 13-15 wpm, but I'm here to tell you, it was so much easier than the traditional method of starting slow and working your way up." Great point Charley!

Listening is only half the fun...

POPULAR COMMUNICATIONS

is the other half.

If you enjoy radio communications in all its variety, you'll love *Popular Communications*

Since 1982 *Pop Comm* has delivered thousands of pages of great reading for both the radio enthusiast and the professional communicator.

Name your favorite interest... *Popular Communications* is there for you. Whether you're into Short-wave Listening, Scanner Monitoring, searching out Pirate Radio broadcasters, CB Radio, Satellite Broadcasting, ACARS, or Ham Radio, you name it, we cover it, every month.

Popular Communications

Subscribe today and save up to 58% off the newsstand price. Save even more with two or three year subs!

YES! Enter my Subscription to *Popular Communications* today!

Name _____

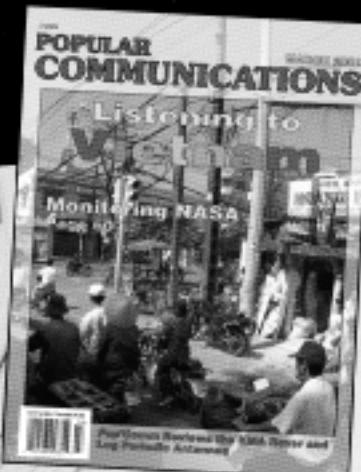
Address _____

City _____ State _____ Zip _____

() Check () MasterCard () VISA () AMEX () Discover

Card No. _____ Expires _____

Signature _____



	USA	Canada/Mexico	Foreign Air Post
1 Year	<input type="checkbox"/> 28.95	<input type="checkbox"/> 38.95	<input type="checkbox"/> 48.95
2 Years	<input type="checkbox"/> 51.95	<input type="checkbox"/> 71.95	<input type="checkbox"/> 91.95
3 Years	<input type="checkbox"/> 74.95	<input type="checkbox"/> 104.95	<input type="checkbox"/> 134.95

Allow 6 to 8 weeks for delivery

FOR FASTER SERVICE FAX 1-516-681-2926

MT 01

Popular Communications 25 Newbridge Road, Hicksville, NY 11801 Telephone (516) 681-2922

Q. What is the proper way to weatherproof coax connectors? I don't want to keep climbing the tower in an effort to open connections, dry and clean them, then re-tape them.

A. Reader John Diefenbach, K1TLV, of Mason, NH, has the answer from years of professional experience installing major antenna systems:

- (1) Apply a small portion of silicon grease (not spray lubricant) to the threads of the connector, but don't get any on the center pin.
- (2) Reassemble the connectors, then PVC-tape the connections with the tape extending two to three inches onto the coax on both sides of the connection.
- (3) Apply Mastic Seal* over the length of the tape and slightly beyond, onto the coax.
- (4) Starting from the *lower* end of the Mastic Seal and spiraling *upward* (important), wrap with Scotch 33 or 88 tape*. At the upper end of the tape winding, cut – do not stretch-break – the tape. Stretched tape relaxes and can uncurl! Now do this tape spiral again, but this time from the top down. Repeat these reverse applications for a total of five layers.
- (5) Finally, clear-coat with acrylic spray lacquer the entire taped section, over-spraying slightly at the ends. This securely weatherproofs your outdoor coax connectors. You may wish to add a black wire-wrap (the UV-resistant type) at each end of the tape for additional security against separation or unwinding. And if you have several lengths of coax, color-code them with colored tapes for identification.

* If you can't find Mastic Seal or Scotch 33 or 38 tape, you can order weatherproofing kits from Site Advantage (1-888-748-3238) for about \$14.00 + postage. There is enough to do several connections.

Q. I would like to monitor the two-tone page frequencies from my area fire departments to determine their tone frequencies. How can I do this? (Mark Nelson)

A. While there are expensive pieces of test equipment designed to do this, there are two much more affordable alternatives, although they may be less convenient because you have to be there to see the readout when the paging tones are being transmitted:

- (1) There are many free down-loadable software programs allowing your sound card to become an audio spectrum analyzer; you could get a rough

calibration from one of those, and compare it with a chart of standard two-tone frequencies;

- (2) Inexpensive frequency counters that go down into the audio range can be plugged into your scanner external audio jack, allowing you to sample the tone while it's being sent. To avoid the inconvenience of having to be ready to plug it in and disabling the scanner's speaker, you could make a Y adaptor with an external speaker on one side and the frequency counter on the other.

Q. Just as gun makers can still legally repair assault weapons made before the ban went into effect, can repairs be legally made on cellular-capable scanners made before the 1993 ban on such products? (Mark Burns, Terre Haute, IN)

A. Yes, it is legal to repair and use lawfully any product that has been approved by the FCC. Approval of such early products has never been withdrawn.

Q. Can I legally use a remote antenna on a hand-held FRS transceiver?

A. No, the FCC requires the antenna to be permanently attached to discourage long distance interference to licensed services. However, at least one FRS manufacturer has apparently found a legal way around this: they mount all the electronics at the antenna base which can be rooftop-mounted, with the control cable coming down to the operator.

Q. I recently acquired a working Grundig 700 portable radio, but after I left a strong magnet in front of it for a minute or so, the receiver quit working – no audio, no reception. What went wrong? (Herbert Kusche, Springdale, AR)

A. I haven't the foggiest notion. It's not likely that you demagnetized the speaker, and there aren't any magnetic switches. ICs, transistors, resistors, capacitors and other common components are not vulnerable to such magnetic fields, and even if the display were affected, you'd still get reception.

There's a remote possibility that rapidly

swinging a strong magnet might have induced voltages into the wiring or inductors (coils) which may have been high enough to damage delicate components, or even incorrectly bias the settings of ICs, including the processor and RAM.

It will be interesting to learn whether or not the radio "heals" after removing the power plug and batteries for a period of a day or so. Readers? Any ideas on this one?

Q. Is amateur radio legal in North Korea and are there many hams? (Anonymous)

A. While U.S. hams are allowed to talk to any licensed amateurs anywhere in the world on our bands, not all countries' citizens have the same reciprocal privilege. American hams have been watching for the P5 North Korean prefix to show up on the air for years, but so far none has been heard.

It's hard for Americans to visualize the isolationism and repression which are a daily regimen in many countries around the world. Hobbies are not even a concept in countries where survival is the mode, and where military regimes regard radio as a clandestine activity.

Q. My Grundig Satellit 800 fell into a bathtub filled with water. I quickly rescued it and it seems to work; what should I do now besides use it for a boat anchor? (Richard Dailey, Pittsburgh, PA)

A. By the time you read this, the radio should be pretty well dried out! Fortunately, if it worked soon after retrieving it from the depths, it couldn't have taken on too much water. The important thing in such an instance is *immediate* drying out. A good bet would be to take off the battery cover to see if there is any water in there, and if there is, it might also be a good idea to remove the cabinet screws and part the cabinet very carefully to encourage air circulation. Even forced air flow with a fan or cool hair dryer would be recommended.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bgrove@grove-ent.com. (Please include your name and address.) The current Ask Bob is now online at our website: www.monitoringtimes.com

Getting Started

Welcome to year 2002. The Chinese New Year's Day for the Year of the Horse is February 12th. No doubt this will be another year of interesting twists and turns. I find it amazing that so many of our major news stories are heard first or simultaneously on our radios. What new radio products will come to market? Start saving your money because I think this is the year we make a giant leap forward. Get out your highlight pen and let's dive into another column of bright ideas.

1
Listen to chatter where there was none. I am referring to the military 225-400 MHz range for military aircraft (AM mode), satellites, and special usage. Listen in

FM mode to the 395-400 MHz range.

National Guard special operations are often found there. With constant patrols by jet fighters, there is now more chatter in the UHF range as well as the VHF air range. These planes need to be refueled in mid-air so the refueling tracks are busier than normal. In addition, the shipments of men and supplies to the Middle East is continuous.

Do you have a scanner with UHF military capability? I dusted off my rarely-used Pro 2052. I used the computer program to upload the correct frequencies. Then I hooked up my discone antenna, which seems to work well over the large frequency spectrum of military air allocations. With 1,000 channels and a fast scan rate, the Pro 2052 is an ideal scanner. RS has lowered the price: Check your local store. The Bearcat 895XLT is also a good choice, and the price has plummeted well below \$200.

2
The events of 9-11 were horrific, yet deemed low tech. It seems to me that any new terrorist activities might be coordinated via radio. They might use some off-the-shelf radios such as the low power business band, or FRS. If you are monitoring and hear suspicious activity, note the details and contact authorities. Before you pick up the phone, you might want to bounce the information off a spouse or close friend. We need to be careful to not to overload the law enforcement authorities with non-serious or incomplete information.

3
Are you a fire buff? Do you have a serious interest in fire equipment, history etc.? There is an excellent article in the September issue of *Firehouse* magazine. Call

your local fire station to see if there is a group in your area. None? So start one. These groups often respond to the scene and provide refreshments and rehabilitation services for lo-

cal firefighters. For more info visit <http://www.firehouse.com/magazine/>.

4
Purchased the new 2002 *Police Call*? Get your money's worth. Remember to use plastic page protectors for the front and rear covers, use fluorescent highlight pens for important information, and use the little pop-up flaggers for bookmarks. You can also use the marker pens to mark pages by grasping the page(s) and highlighting the outside edge of the page. Do it again and really lay on the ink. Close the book and examine your work. Do the pages stand out? If not, hit them again with the pen marker. Now you can easily find your important pages.



The Ultimate Vest™

5
I know that many of my readers are involved in public service work thru their ham radio RACES/ARES, Red Cross, Salvation Army, or REACT programs. Well, here is a vest that is light years beyond the chest packs just mentioned in the November column. I have one and really find it useful, comfortable, and sharp looking in the red version. I have it fully stuffed with the many little equipment items I need in the field. It rests on a hanger in the back of my vehicle, ready for immediate deployment at any time. No more leaving something behind. The vest supplements my "grab and go bag" for emergencies.

After the September events, proper ID and the "official professional look" will be the new standard mode for emergency radio communications responders. You can visit the website at <http://emcommsupply.com/UltimateVest.htm> or contact Emergency Communications Supply Inc., P.O. Box 3404, Florence, OR 97439, (541) 997-7004. These run in the \$100-150 range. Can't afford one? Can you afford to be without one? Well, you can at least look at them...

6
Do you have a radio that can be programmed via computer? It is well worth the money because it makes it so easy to load up a new set of frequencies or trunked system when you are preparing to travel

Bright Ideas

Gary Webbenhurst

P. O. Box 344, Colbert, WA 99005-0344

ab7ni@arrl.net

or use the radio for a special event such as an air show, car race, or disaster monitoring. Here is a partial list of radios that can be programmed via software. Yaesu transceivers FT-10, 11, 40, 41, 50, and 50R. Also their 2600M, FT 90, 1500, 3000, 8000, 8100, 8500, VX-1R, 5R, VX-110, 150, and VR-500. Icom T series, R series and 2100/207 series. There are some websites that offer downloaded databases. The best one is the Pro 92 and 2067 at <http://www.pro-92.com/database.htm>.

I am planning to put up a website and would like to establish a list depository of databases for special events or geographical areas. If you have a list to contribute or a special request, please drop me an email note. If there is enough interest, I will create an area for files that you could download.

7
If you are a faithful reader of this column, you will remember an earlier idea of using auto stereo speakers and/or mini desktop speakers for your scanner audio output. The Home/Theater and computer related ones are usually shielded. On sale they are a good bargain at \$10-20. In the moving process, the black paint on the grille on my speaker rubbed off in a few places. I could have repainted the entire surface with black paint. But I used my faithful black permanent ink marker to dab the scratch marks – a near perfect match.

I just moved into my brand new retirement house. I am hoping it will qualify as a "radio ranch." In the next three monthly columns, I will present some of the problems and creative solutions I found in establishing my new radio room. They will be as follows: February-planning and installing radio equipment; March will be AC, DC, and emergency power sources; April will be the all important antenna issue. See you next month.



RECORD INCOMING INFORMATION.
SOLID STATE 13 MIN RECORD TIME.
PAUSE, SKIP FORWARD AND BACK
FUNCTIONS. GREAT FOR CW. MIC
OR DIRECT. INPUTS. 12VDC.

BOREL MANUFACTURING INC.
REDWOOD CITY, CA.
WWW.BORELMFG.COM OR
CALL: 800 824-4449

Robert Wyman

wymenant@bellsouth.net

Assistive Listening Devices follow-up

MReader Allan Dunn of Holbrook, Massachusetts, sent a detailed e-mail on Assistive Listening Devices (ALDs) in follow-up to our November column. Allan installed an ALD system at his church in 1995. "It is a single channel unit manufactured by Telex. The transmitter is 50 mW operating on 71.900 MHz narrow FM. It accepts audio from either line level or microphone level sources using cables with either an XLR microphone connector or 1/4 inch phone plug," Allan wrote.

"The unit came with three credit-card-sized single-channel receivers which are powered by two AAA batteries," he continued. "For operator simplicity there is only an on/off volume control with a red LED to indicate when it is powered. There is a 1/8" phone jack for either an ear bud or a loop device for hearing aids. The ear bud cable acts as the receiving antenna."

"We currently have about a dozen people using them regularly. The users in our congregation love them. Hearing aids pick up all the sound reflections in the room including people shuffling their feet. The ALD picks up only the near field audio into the church microphones. The audio feed we use is identical to that for cablecasting the service. The users are primarily elderly, although one 8 year old requires one."

Although designed for in-house use within auditoriums and assembly areas, the radio signal can actually be heard some distance from the building. Allan continued, "The system has been virtually flawless over the past six years. One 90 year old woman who has been a member for over 60 years recently became ill and was forced to miss the services. I gave her 70 year old son

(an avid scanner listener) one of the receivers to take to her, as she lived only 1/4 mile away. I asked that she try listening during the services. When she returned to the church weeks later, she thanked me profusely. It worked perfectly."

In fact, the system is quite popular. "...she asked if she could keep it. This past March a snow storm hit early on a Sunday morning, and she could not get out. Somebody phoned her at 11 o'clock, and she told the caller she could not talk as she was at church. I don't know if the caller understood!"

Allan also made a technical note for us. "I recently drove around during our early service listening on a Yaesu VX-5R ham transceiver. In most directions the signal was full quieting within a 0.7 mile radius. Not bad for 50 mW. I have monitored the frequency from my home 1.8 miles away using an Icom R7100. No sign of it there..., but I have found the frequency to be very quiet. There are pagers and one public service user in the 72-76 MHz band, but nothing near enough to cause any problems."

"Our church is continually looking for new ways to reach unchurched people in the community. We recently gained two new attendees who chose our church because they can hear, thanks to ALD receivers."

Allan, thanks so much for your informative report.

◆ Who's Listening?

Hospital Emergency Rooms are depicted almost daily on television dramas and movies. While ER two-way communication systems are often used as props, scanners rarely enter the storyline. In real life, however, Dr. John Braden plants a Uniden BC245XLT directly in front of his desk. Dr. Braden is the ER Assistant Director at Cedars Medical Center in Miami, and his personally-owned scanner accompanies him on every working shift.

Cedars is a Category 2 Trauma Center serving the City of Miami (Florida) and surrounding communities. The facility also provides overflow support to the Ryder



Dr. John Braden

Trauma Center, a Category 1 unit located nearby at the University of Miami / Jackson Memorial Hospital (JMH) medical complex.

When on-duty, Dr. Braden monitors dispatch and medical channels for local fire-rescue departments, plus some police frequencies of interest. "It gives us a heads-up for traffic crashes and patient movements," John advised. A mini-bus rollover on I-95 in Miami was a prime example. "The rollover was a multiple-casualty incident. The injured were being transported to JMH, but we heard (on the scanner) that some patients may be headed to us because Jackson was nearing capacity."

Dr. Braden monitored police, fire, medical and hospital channels for that situation. "We had an additional twenty minutes of time to prepare for the influx," John continued. ER staff began allocating resources and personnel well before the official notifications reached the hospital.

As may be expected, two-way radios and special receivers are also utilized in the ER. Currently installed systems include voice and medical telemetry channels for the City of Miami Fire Department (800 MHz Motorola trunked system) and Miami-Dade County Fire Department (462-463 MHz MedCom allocations plus 800 MHz EDACS trunked system), hospital administrative channels (UHF business band), NOAA weather radio, and a separate medical telemetry printer that can be accessed via cellular modem. Other radio systems in the building include wireless cardiac monitors and personal protection monitors.

ER staff members work 12-hour shifts and consist of one doctor, one physician assistant and five to eight nurses. All are familiar with the



Cedars' ER



Dr. Braden's work station

various radio systems and communication protocols. "We participate in all the local drills and simulations, such as those for biohazards, chemical spills, mass casualty incidents and hurricanes." These drills are now more significant in light of recent world events, and staff members are well aware of potential threats.

"We also get cruise ship passengers and crew members who are injured at sea," said John. Language barriers are easily overcome with the ER's multi-lingual staff and the use of AT&T interpreters.

"Our biggest problem is RF shielding. We're on the ground floor, and hundreds of pounds of electrical equipment and x-ray machines surround us." Although MedCom radio antennas are mounted on the hospital roof several hundred feet above the ER, other systems are problematic. The NOAA weather radio, for example, cannot easily pull in a signal with its telescopic rod antenna. Hospital engineering staff and the ER are working on new antenna mounting locations and cable runs to satisfy these issues.

I wish to thank Dr. John Braden for his outstanding information and detailed tour of the ER unit. As demonstrated by Dr. Braden and the fine ER staff at Cedars, scanners can be essential tools in the business of saving lives. A better use for scanners will be hard to find.

◆ **On-Scene Commander**

My tour of the ER at Cedars would not be complete without some on-scene work. Have you ever heard a wireless cardiac monitor? It's not the most exciting thing to listen for, since it sounds like a digital symphony of tones, beeps and warbles, but check out the UHF business band the next time you're visiting someone at a large hospital. Frequencies found at Cedars and the nearby JMH complex appear in Table One.

◆ **Bank Number One**

Let's consider some monitoring strategy issues this month instead of specific Bank One frequencies. What happens to old frequencies when an agency changes to a new radio system?

When a jurisdiction or agency switches to a new system – such as from a VHF or UHF police, fire or local government channel plan to an 800 MHz trunked system – many hobbyists ignore the older system in favor of hearing the

new system. This begins when new frequencies are licensed and continues through the testing, evaluation and deployment stages.

In fact, it's great fun to listen in as technicians set up antenna sites, check signal radiation patterns, measure various transmitter parameters and begin the process of moving users from the old system to the new one. A simultaneous broadcast, or "simulcast," is often implemented to temporarily link the old and new systems.

For example, an old police repeater (consisting of a repeater input frequency and a repeater output frequency) may be simulcast

as a single talkgroup on a new trunked system. Employees using the old system can operate their radios as they always have; employees who have been issued new radios are instructed that a particular talkgroup has been set up to link or patch in the old repeater.

Users on both the old and new systems operate as if they are on a single system, since the link is transparent to individual radio operators. Police radio traffic may be monitored on the old repeater (output) frequency and the trunked frequencies at the same time.

Once the new system is fully operational, old frequencies fall silent. Hobbyists sometimes delete them from scanners and consider them obsolete, but a better strategy exists. If your jurisdiction's old frequencies have been replaced by a new radio system, program all the old freqs into a new bank, including former input, output, simplex, data and paging channels.

Remember, all frequencies have specific uses or "allocations" as designated by the FCC. Let's say you're aware of a former police frequency that was used for mobile data terminals or paging. Since you never heard any voice communications on the channel, you locked it out many years ago. That channel's allocation, however, probably allows for any public safety use. Months after the new trunked system has been deployed, the police department may find a new use for the frequency and put it back into service. Tactical applications using simplex are often reported.

If the police department doesn't use the frequency, another department within the same jurisdiction may inherit it. That is, the police may dispose of the old radios or frequencies, but a department like Building and Zoning Inspection can end up with those same radios and frequencies, since they qualify as a "public safety use."

When the original jurisdiction wishes to completely dispose of the frequency, the next most likely new user will be another jurisdiction within the same geographic area. A county fire channel may find a new use as a nearby city fire or government channel.

There is no guarantee that an old frequency will be reassigned, but the radio spectrum is still a limited resource with licensing issues and equipment costs. A government jurisdiction with a small radio budget may look to reuse old systems before purchasing new ones or abandoning channels altogether.

Here's an example of how radio channels have changed in South Florida:

The Village of Pinecrest was created in the mid 1990s from a previously-unincorporated section of Miami-Dade County. They decided to implement their own police communications system instead of operating on the county system. The Pinecrest system is composed of channels abandoned by other local jurisdictions (when the others switched to trunked systems):

453.05 (formerly City of Miami PD)
453.30 (formerly City of Miami PD)
453.65 (formerly Miami-Dade County local government)

◆ **On the Keyboard**

I didn't have column space to include Part 1 of the Geographic Frequency List series, so we'll start that project next month!

◆ **Links of interest from this column:**

Telex Assistive Listening Devices:
<http://www.telex.com>

Table One: Wireless Cardiac Monitors

These are just a sample of channels found in Miami: search from approx. 461-470 MHz in 12.5 kHz steps, narrowband FM, for channels at hospitals in your area. These are low-power systems located in the business band, so you may also hear other communications on the same frequencies.

466.1125	466.4625	468.2375
466.1375	466.5125	468.2625
466.1625	466.5375	468.7875
466.1875	466.7625	468.8875
466.2625	467.0125	469.0375
466.3375	467.1375	469.1125
466.3875	467.1625	469.1375
466.4125	468.2125	469.1625



ER listens to City of Miami Fire Rescue

Scanning in Edmonton

Happy new year to all *Scanning Canada* readers. Your columnist from the Great White North is hunkered down in freezing temperatures waiting for spring. In just a few short weeks Canada's famous Wiarton Willie, the albino groundhog, will step out of his burrow and tell us how soon we can get up on the roof to maintain our antennas. In the meantime we will put some more wood in the fireplace and continue our cross-country tour of the nation's airports.

◆ Edmonton International Airport

Last month we touched down in Calgary – the business center of the province of Alberta, home of Canada's energy industry and nearly all of the country's oil companies. We start 2002 in the same province, but with a look at Alberta's provincial capital as *Scanning Canada* moves north to the city of Edmonton.

Just three hours road trip north of Calgary we find a very different city. While Calgary enjoys bizarre, but usually comfortable weather ("if you don't like the weather in Calgary – wait a half hour" as they say), Edmonton in January is a cold, snowy city. Some years, Edmonton is a cold, snowy city at any time of the year!

The city of Edmonton has one claim to fame; it is home to the famous "West Edmonton Mall," a huge shopping and entertainment complex. West Edmonton Mall features an enormous wave pool, a massive roller-coaster and a giant indoor lake with more submarines than the Canadian military. *Scanning Canada* will return to the mall in a later column, but this month our stop in Edmonton will focus on the International airport. Your *ScanCan* columnist has visited Edmonton several times and is quite familiar with Edmonton International Airport. The following tables provide the air traffic control and navigation frequencies that are used at the airport.

Edmonton International Airport (CYEG)

Air Traffic Control (MHz, AM)

Radio: 122.5, 126.7

Automatic Terminal Information Service: 128.0

Clearance Delivery: 124.1

Ground: 121.7, 275.6

Tower: 118.3, 381.2

Arrivals: 120.5, 363.8

Departures: 133.65, 363.8

VFR (Visual Flight Rules) Advisory: 118.3, 119.5, 127.4

Edmonton Centre 134.7, 134.9, 240.9, 250.05, 294.5

Navigation beacons

VOT: 114.8

Vortac: YEG 117.6 (53 11 08N 113 52 01W)
(Vortac = VHF Omnidirectional Range/Tactical Air Navigation)

IEG 110.3 (runway 02/20)

IFP 109.9 (runway 12)

IKB 109.1 (runway 30)

◆ Monitoring Canada's Military – part 1

The Canadian Armed Forces is an umbrella organization that includes Canada's army, navy and air force. Unlike the United States, Canada operates its Coast Guard as a government controlled civilian agency. Canada's armed forces have suffered enormous cutbacks over the last ten years, although recent world events have spurred the federal government to loosen the purse strings once again. Funding cutbacks spawned the closure of many bases, but fortunately there are still enough bases open around the country to provide something for military monitoring enthusiasts to listen for. *ScanCan*'s home province of Ontario features several bases including the home of Canadian Forces Recruiting at Borden.

A recent drive to the base with the XYL (for the benefit of non-hams XYL is eX-Young Lady = wife) provided an interesting weekend trip. Amid heightened security I was more than a little apprehensive about approaching the gates with my frequency counter on the dash of my car. The imaginative engineers who designed my unit equipped the counter with a button marked "Arm." XYL was not amused and was convinced that she would be driving home alone following my detention by the base MPs. I car-

ried photo ID and a recent copy of *MT* with the *Scanning Canada* column for identification, but fortunately my visit was uneventful. The photo showing the "Welcome to Borden" sign witnesses my visit and successful military monitoring mission.

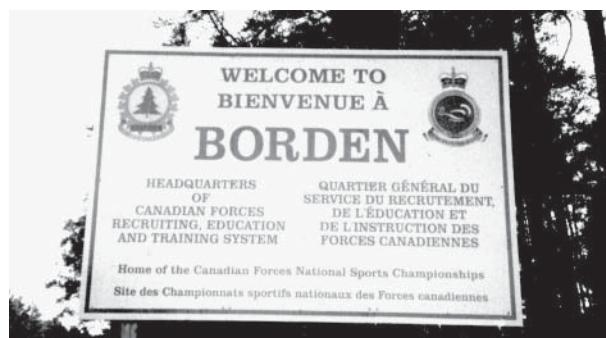
Borden is home to 400 Squadron, 1 Wing (headquartered at another Ontario base in Kingston). Although there are three runways at Borden, its days as a base for military fixed wing aircraft are over. Apart from the popular summer airshows held at the base, the only aircraft operating out of Borden are seven CH146 Griffon helicopters. Borden's 400 Tactical Helicopter Squadron is usually deployed in support of sovereignty patrols, secondary search and rescue, and in support of Land Forces Central Area during peacetime. When mobilized (as may be the case at the time of writing), 400 Squadron acts in support of 427 Squadron in Petawawa, Ontario, which has a larger deployment of the same CH-146 Griffons.

Borden Flying Club is a civilian organization operating a single Cessna 172 from inside the base. A local soaring club's gliders can also be seen in the air over Borden most weekends in the summer. Borden Flying Club caters to both military and civilian pilots. A good opportunity to visit the base is as a guest of the flying club. However, Canadian Forces requires 48 hours advance notice for non-member fly-ins.

Canadian Forces Base Borden uses two frequencies for air traffic control (118.875, 311.6) and several others for ground operations. 400 Squadron uses 40.9 MHz, but other VHF high-band frequencies that have been active in the past have fallen silent. It is believed that an 800 MHz band trunked system may have been deployed at the base. Borden is located about 50 miles north of Toronto at 44 16 20N, 79 54 42W near the small community of Angus.

Next month we will take a look at another of Canada's Forces bases in part 2 of this series. We will also continue our eastward swing through Canada's civilian airports, with February seeing *ScanCan* move into the prairies.

A special note of thanks is owed to all the *MT* readers who have written *Scanning Canada* with words of support, and information for publication. Your contributions are always welcome.



Canadian Forces Base Borden, home of 400 Squadron

HF Aero Frequencies

2850-3025 kHz AERONAUTICAL MOBILE (R)

2869 CEP MWARA: San Francisco, CA USA
 SEA RDARA (14G): Australian Domestic Aeradios Southeast-Adelaide
 2872 NAT MWARA: Gander, NF Canada; Shanwick, UK
 2887 CAR MWARA: New York, NY USA
 2899 NAT MWARA: Gander, NF Canada, New York, NY USA; Santa Maria, Azores; Shanwick, UK
 2926 NCA RDARA: Baku Aeradio, Azerbaijan; Mineralnyye-Vody; Rostov; Yerevan
 2932 NP MWARA: Tokyo, Japan
 2941 VOLMET: Kiev, Ukraine (H+20)
 2950 NAT RDARA (10F): Greenland Domestic Aeradios-Kangerlussuaq
 2962 NAT MWARA: Canarias, Canary Islands; New York, NY USA; Santa Maria, Azores
 2965 VSEA VOLMET: Bangkok, Thailand
 2971 NAT MWARA: Gander, NF Canada; Shanwick, UK
 2978 CWP MWARA: Honolulu, HI USA; Naha, Okinawa
 3010 LDOC: Athens (Olympic Airlines), Greece; Berne, Switzerland; Dublin (Aer Lingus), Ireland
 3015 EUR RDARA: Greek Domestic Aeradios Network
 3016 NAT MWARA: Canaries, Canary Islands; Gander, NF Canada; New York, NY USA; Santa Maria, Azores; Shanwick, UK

3400-3500 kHz AERONAUTICAL MOBILE (R)

3413 CEP MWARA: Honolulu, HI USA; San Francisco, CA USA
 LDOC: New York ARINC, NY USA
 VEUR VOLMET: Shannon, Ireland
 3425 VOLMET: Cordoba, Argentina (H+30)
 SP RDARA (9B): Nadi, Fiji
 3440 EUR RDARA (2A/2C): Russian Domestic/Regional Aeradios-Aktubinsk, Penza, Uralsk
 3446 LDOC: Tors Cove (Rainbow Radio), NF Canada
 3452 SAT MWARA: Dakar, Senegal; Recife, Brazil; Sal, Cape Verde Islands
 SEA RDARA (14C): Australian Domestic Aeradios Central/Eastern/North-East/North-Central-Adelaide
 3455 CAR MWARA: New York, NY USA
 3461 SEA RDARA (14): Australian Domestic Aeradios Southwest/South Central-Adelaide
 3467 SP MWARA: Brisbane, Australia; Nadi, Fiji
 MID RDARA: Russian Domestic/Regional Aeradios-Ashkhabad, Samarkand, Tashkent
 3470 SEA MWARA: Medan, Indonesia
 3476 NAT MWARA: Gander, NF Canada; Shanwick, UK
 3485 VNCA VOLMET: Gander, NF Canada and New York, NY USA
 3494 LDOC: New York ARINC, NY USA
 4472.5 Canada FSS Radio: Tanquary Fiord, NWT
 4495 Hydro Quebec Radios (Quebec): Fontanges, Nemiscau
 4564 LDOC: Berne, Switzerland
 4645 VOLMET: Tallinn, Estonia

4650-4700 kHz AERONAUTICAL MOBILE (R)

4654 LDOC: Berne Radio, Switzerland
 4663 VNCA VOLMET: Khabarovsk, Russia
 4666 CWP MWARA: Honolulu, HI USA; Tokyo, Japan
 4669 RDARA: Russian Domestic/Regional Aeradios-Aktubinsk, Arask, Ashkhabad, Kyzl-Orda, Tashkent
 4670 LDOC: Berne, Switzerland
 4675 NAT MWARA: Bodø, Norway; Cambridge Bay (Baffin Radio), NWT Canada; Gander, NF Canada; Montréal, PQ Canada; Reykjavik (Iceland Radio), Iceland; Shanwick, UK
 4678 SEA RDARA (14A/14G): Australian Domestic Aeradios Southeast-Adelaide
 4682 Canada FSS Radio: Lac-a-la-Tortue, PQ
 4684 SEA RDARA (14B/14C): Australian Domestic Aeradios Southwest
 4687 LDOC: Sydney/Perth (Qantas Control), Australia
 4693 SEA RDARA (14D): Australian Domestic Aeradios South Central-Adelaide
 4712 RDARA: Russian Domestic/Regional Aeradios-Kiev, Ukraine; Mineralnyye-Vody; Odessa; Penza; Rostov; Simferopol; Tbilisi; Uralsk; Yerevan
 4728 RDARA: Russian Domestic/Regional Aeradios-Aktubinsk, Ashkhabad, Krasnovodsk, Samarkand, Tashkent
 4745.5 RDARA: Upennavik Radio, Greenland (1100-1900, closed 1500-1700 UTC November 1-March 31)
 4895 Canadian FSS Radio (Manitoba): Berens River, Bloodvein River, Brochet, Cross Lake, Gods Lake Narrows, Ilford, Lac Brochet, Little Grand Rapids, Norway House, Pikwitonei, Red Sucker Lake, Shamattawa, South Indian Lake, Thicket Portage, York Landing

5012-5290 Canada FSS Radio: Fontanges, PQ

5080 Canada FSS Radio: Norway House, MAN
 5281.5 Canada FSS Radio: Tanquary Fiord, NWT
 5290 LDOC: Stockholm Radio, Sweden

5450-5480 kHz AERONAUTICAL MOBILE (R)/(OR)

5475 LDOC: Elite Ops (Elite/Canada 3000) Toronto, ON Canada
 VOLMET: Ezeiza, Argentina (H+00)

5480-5680 kHz AERONAUTICAL MOBILE (R)

5487 NCA RDARA: Baku Aeradio, Azerbaijan; Mineralnyye-Vody; Rostov; Yerevan

5490 LDOC V.C. Bird (LIAT), Antigua

5493 AFI MWARA: Brazzaville, Congo; Luanda, Angola; Kano, Nigeria; Kisangani, Zaire; Kinshasa, Zaire; N'djamena, Chad

5498 Canada FSS Radio: Norway House, MAN

5505 VEUR VOLMET: Shannon, Ireland

5508 SAM RDARA (12F): Colombia Domestic Aeradios-Quibdo

5517 AFI RDARA: Addis Ababa, Ethiopia; Asmara, Eritrea; Mogadishu, Somalia; Nairobi, Kenya; Tripoli, Libya

5520 CAR MWARA: New York, NY USA

5526 SAM MWARA: Belém, Brazil; Bogotá, Colombia; Brasília, Brazil; Manaus, Brazil; Paramaribo, Suriname; Porto Velho, Brazil

5528 SEA RDARA (14): Australian Domestic Aeradios Southeast-Adelaide, Sydney

5529 NAT RDARA (10F): Greenland Domestic Aeradio Network-Godhaf, Greenneodl, Julianehaab, Kangerlussuaq, Nuuk, Reykjavik (Iceland), Sondrestrom, Sukkertoppen

5528 LDOC: Manama (Falcon-Gulf Air), Bahrain

5529 LDOC: Boyeros, (Cubana) Cuba; Brussels (Sabena), Belgium; Madrid (Iberia), Spain; Reykjavik (Icelandair), Iceland; Santo Domingo, Dominican Republic

5530 CAR RDARA: Cancun, Mexico; Flores, Guatemala; Guatemala City (Aurora), Guatemala

5532 LDOC: Dublin (Aer Lingus), Ireland; Rome (Alitalia), Italy; Lisbon (Air Portugal-TAP), Portugal; Abu Dhabi, UAE; Prague (CSA Czech Airlines), Czech Republic; Springbok Radio (South African Airways) Johannesburg, South Africa

5535 LDOC: Chicago (Chicago Dispatch/United), IL USA; Lima (Flight Support), Peru; Pierco Operations (BWIA), Trinidad; Speedbird Radio (British Airways) London, England

5538 LDOC: Port Louis (Air Mauritius), Mauritius; Beirut Middle East Airlines (Cedar Base), Lebanon

5541 LDOC: Rio de Janeiro (VARIG), Brazil; Stockholm, Sweden

5544 LDOC: Jeddah (Saudi Airlines), Saudi Arabia; Boyeros (Cubana), Cuba

5547 CEP MWARA: Honolulu, HI US; San Francisco, CA USA

5550 CAR MWARA: Boyeros, Cuba; New York, NY USA

5553 LDOC: Belém (VARIG), Brazil

5556 SAM RDARA (12): Colombia Domestic Aeradios-Armenia, Buenaventure, Cali, Florencia, Ibagué, Ipiales, Medellín, Neiva, Pasto, Pereira, Popayán, Puerto Asís, and Quibdo

5557 NCA RDARA: Nikolaevsk Aeradio, Russia

5562 CAR RDARA (12D): Cuban Domestic Aeradios-Boyeros, Cayo Largo, Santiago, Varadero

5565 SAT MWARA: Dakar, Senegal; Recife, Brazil; Sal, Cape Verde Islands

5568 LDOC: V.C. Bird (LIAT), Antigua; Beef Island (LIAT), British Virgin Islands; Adams (LIAT), Barbados

5571 LDOC: Moody Aviation (Moody Ops), Elizabethport, TN

5574 CEP MWARA: Honolulu, HI USA; San Francisco, CA USA;

5574 SAM RDARA (13G): Resistencia, Argentina; La Paz, Bolivia;

5586 SEA RDARA (6D): Singapore Radio (3413 sec)

5586 NCA RDARA (2C/3C): Russian Domestic/Regional Aeradios-Aktubinsk, Penza, Uralsk

5589 LDOC: El Al Operations Tel Aviv, Israel

5598 NAT MWARA: Canaries, Canary Islands; Gander, NF Canada; New York, NY USA; Pierco, Trinidad; Santa Maria, Azores; Shanwick, UK

5601 MID RDARA (6A): Bombay India

5601 VSAM VOLMET: Buenos Aires (Ezeiza), Argentina (H+00/H+20); Asuncion (H+10)

5604 LDOC: Tors Cove (Rainbow Radio), NF Canada

5616 NAT MWARA: Gander, NF Canada; Reykjavik (Iceland Radio), Iceland; Santa Maria, Azores; Shanwick, UK

5628 NP MWARA: Honolulu, HI USA; San Francisco, CA USA; Tokyo, Japan

5634 INO MWARA: Antananarivo, Madagascar; Beira, Mozambique; Perth, Australia; Port Louis, Mauritius; Seychelles, Seychelles; Tananarive, Madagascar

5637 EUR RDARA (1D): Cairo, Egypt; Khartoum, Sudan; Malta, Malta; Romania Domestic Aeradio-Bucharest; Tirana, Albania; EUR RDARA (1D): Greek Domestic Aeradios Network-Agrinion; Aleksandroupolis (Dimokritos) [LGAL]; Andriavida; Athinai (Hellinikon); Chania (Souda); Corfu/Kerkyra (Ioannis Kapodistrias) International [LGKR]; Ionnina; Iraklion (Nikos Kazantzakis) International Airport [LGIR]; Kalamata; Karpathos; Kasos; Kastoria (Aristotelis) [LGKA]; Kavala (Megas Aleksandros) [LGKV]; Kefallinia (Argostoli); Khios; Kos; Kozani (Philippos) [LGKZ]; Lassis; Limnos; Mikonos; Milos; Mitylini; Mykonos; Preveza; Rodos (Diagoras) International [LGPR]; Saloni; Samos; Skiatos; Sparta; Thessaloniki (Makedonia/Mikra) International [LGTS]; Thira (Santorini); Zakynthos LDOC: Athens (Olympic Airlines), Greece

5638 EUR RDARA: YRA-Romania Domestic Aeradio-Bucharest (CW)

5640 VOLMET: Shannon, Ireland

5643 SP MWARA: Auckland, New Zealand; Brisbane, Australia; Honolulu, HI USA; Nadi, Fiji; Noumea (Tontouta), New Caledonia; Papeete (Tahiti Radio), French Polynesia; Perth, Australia

5645 LDOC: Brussels (Sabena), Belgium

5649 NAT MWARA: Gander, NF Canada; Reykjavik (Iceland Radio), Iceland; Shanwick, UK

5652 AFI MWARA: Algiers Radio, Algeria; Brazzaville, Congo; Tripoli Radio, Libya; N'djamena, Chad; Niamey, Niger

5655 SEA MWARA: Hong Kong, Hong Kong; Kuala Lumpur, Malaysia; Manila, Philippines; Singapore, Singapore

5658 AFI MWARA: Addis Ababa, Ethiopia; Asmara, Eritrea; Bujum Bura, Burundi; Cairo, Egypt; Dar es Salaam, Tanzania; Djibouti, Djibouti; Jeddah, Saudi Arabia; Khartoum, Sudan; Mogadishu, Somalia; Nairobi, Kenya; Sanaa, Yemen; Seychelles, Seychelles; Tripoli, Libya

MID MWARA: Bangkok, Thailand; Bombay, India; Dehli, India; Kabul, Afghanistan; Karachi, Pakistan; Lahore, Pakistan; Tehran, Iran; Urumqi, China

RDARA: Russian Domestic/Regional Aeradios-Ashkhabad, Samarkand, Tashkent

5661 EUR MWARA: Athens, Greece; Malta, Malta

5667 MID MWARA: Manama, Bahrain

NP MWARA: Honolulu, HI USA; Hong Kong, Hong Kong; Tokyo, Japan

EA MWARA: Colombo, Sri Lanka; Dhaka, Bangladesh; Kuala Lumpur, Malaysia; Madras, India; Male, Maldives; Medan, Indonesia; Nouadhibou, Mauritania; Nouakchott, Mauritania; Yangon, Myanmar

5673 VSEA VOLMET: Beijing, China (H+00)

5680 Worldwide calling/distress/safety frequency

Canada FSS Radio: Alert, NWT; Baker Lake, NWT; Churchill, MAN; Fort Nelson, BC; Fort Simpson, NWT; Fort Smith, NWT; Goose Bay Radio, Inuvik, NWT; Igaluit, NWT; Kapuskasing, ON; Kuujjuaq, PQ; Kuujjuarapik, PQ; La Grande Rivière, PQ; Le Ronge, SK; Lynn Lake, MAN; Matagami, PQ; Norman Wells, NWT; Rankin Inlet, NWT; Resolute Bay, NWT; Roverval, PQ; Rouyn-Noranda, PQ; St. Anthony, NF; St. John's, NF; Sept-Îles, PQ; Thompson, MAN; Wabush, NF; Whitehorse, YT; Yellowknife, NWT

5685 AFI RDARA: Mogadishu, Somalia

5691 VOLMET: Irkutsk (H+55); Khabarovsk (H+15)

5733 RDARA: Australian Domestic Aeradios: Darwin and Perth

5912 EUR RDARA: Greek Domestic Aeradios Network

(To be continued)

Key to Abbreviations:

AFI	Africa
CAR	Caribbean
CEP	Eastern Pacific & Hawaii
CWP	Western Pacific
EA	Eastern Asia
EUR	Europe
INO	Indian Ocean
LDOC	Long Distance Operational Control
MID	Middle East
MWARA	Major World Air Route Areas
NAT	North Atlantic
NCA	Siberia & China
NP	North Pacific
(OR)	Off-Route
(R)	Routed
RDARA	Regional and Domestic Air Route Areas
SAM	South America
SEA	Australia & S. Pacific
SP	South Pacific
VOLMET	Aviation weather broadcasts

Hugh Stegman

utilityworld@ominous-valve.com
www.ominous-valve.com/uteworld.html

Cuban Spy Base Closes

One of the world's largest listening stations is closing as of January 2002. This is the Russian intelligence base at Lourdes, just south of Havana, Cuba, about 100 miles from the United States. Its closure comes as a complete surprise; as recently as 1999 Russian president Vladimir Putin had called Lourdes an important part of his decision support capability.

Established immediately after the 1962 missile crisis, Lourdes grew into a truly sprawling facility. It gobble up an area 28 miles square, causing the abandonment of two villages nearby. It employed 1000 to 1500 highly skilled personnel. These came from the Russian GRU, a military intelligence agency, and from FAPSI, the Federal Agency for Government Communications and Intelligence. FAPSI is the successor to the signal intelligence department of the now-defunct Soviet KGB.

At one time, 75 per cent of Russian signal intelligence came from Lourdes. Satellite photos showed two large antenna farms with satellite dishes and microwave intercept gear. Presumably, at least a few high-frequency (HF or "short wave") antennas were present as well, though pictures available to civilians never seemed to pick these up.

Russian President Vladimir Putin said that money was the reason for the closure. Indeed, the yearly cost for salaries, rent to Cuba, and general expenses translated into well over 200 million US dollars. Few experts really believe this cost-cutting explanation, however. Most think that either the base had been made at least partially obsolete by newer encryption and communication technologies, or that Russia was seeking to eliminate a longtime sore point in its relations with the United States.

So how does all this translate into things we'll hear in HF utility? This is unknown. It will definitely be worth looking for any changes in four Cuban stations. Three of these are "numbers," the deeply encrypted broadcasts almost certainly for spies. The fourth station is operated by and for the Russian Navy.

The best known numbers broadcast is, of course, the notorious "Atencion" (Attention!) transmission. This is a machine-generated, Spanish, female voice. "She" has been holding forth in a sloppily-engineered, amplitude-modulated broadcast since the sixties. Hard core numbers fans know this one as "V2." This is the identifier given by ENIGMA 2000, the new electronic

version of the European Numbers Gathering and Monitoring Association.

The voice numbers have a Morse code counterpart in continuous-wave (CW) telegraphy, often with an absolutely earsplitting signal into the US. While many CW senders shorten numbers down to letters for faster transmission, this is the only "cut number" station using the sequence ANDUWRIGMT for 1 through 0. Except for a few procedural signals, no other characters ever appear in its broadcasts. This station has the ENIGMA designator of M8, and its machine sending is easily copied by computer.

The third numbers broadcast to watch is the "English Woman," ENIGMA E17, a female voice believed to come from Russian intelligence, and definitely transmitted from somewhere in the Western Hemisphere. This, too, is a powerful station, and not hard to hear when it's transmitting.

The last utility that bears watching is CMU 967, operated by the Russian Navy. It's one of the world's last holdouts for maritime Morse telegraphy, keeping up erratic, CW schedules with "RMP" and "RCV" on 14697, 16023, 18073, 18562, and 20138 kilohertz (kHz).

While it's intuitive that the closing of a sensitive listening station should have no effect on high-power HF transmitters located elsewhere, nothing is ever that simple in Cuba. For example, both V2 and M8 missed five days worth of schedules at the exact time that the fate of Lourdes was being decided in a series of Russian military meetings described as "stormy." Many listeners worldwide reported a nearly total silence from November 12 through the 17th. It ended almost at the exact hour of Putin's announcement.

Though this gap is probably unrelated, we

obviously can't dismiss the Lourdes matter just yet. We'll have to keep tabs on these Cuban stations in the months to come, and see if anything changes. With any luck, all this will finally answer the question of whether any of these transmissions came from Lourdes, or (more likely) the Radio Havana site at Bauta. This is a great intelligence opportunity.

◆ US Military HF Broadcasting

Listeners worldwide are reporting a broadcast feeder for the US "Information Radio" into Afghanistan. It's on 8700 kHz upper sideband (USB), with music and bulletins in local languages. In the US, it's heard just before local dawn, and again in the evening. Since it's right in the middle of a maritime CW allocation, some interference will be inevitable.

This military feeder, from somewhere in central Asia or the Indian Ocean, is almost certainly being used by EC-130J "Commando Solo" radio aircraft of the US Air Force Reserve. These planes rebroadcast programs to Afghans in the more "normal" entertainment bands. There are even reports that windup radios have been dropped into the area to facilitate listening.

Meanwhile, the US military continues its worldwide relays of the Armed Forces Radio/TV Service and American Forces Network. These allow personnel on certain vessels to hear the "voice channel" radio programming. You'll remember that AFRTS/AFN relays came back onto HF from a number of military communication stations when a Navy satellite contract was not renewed. These, too, are in utility bands, and they are subject to interference. Several schedules are floating around the Internet, all of which are wrong. Here's the best one as of mid-November:

Location	Daytime	Nighttime
Key West, FL	12689.5	12689.5 kHz
Puerto Rico	6458.5	6458.5 kHz
Sigonella, Sicily	4993.0	10940.5 kHz
Barrigada, Guam	13362.0	5765.0 kHz
Diego Garcia	12579	4319 kHz
Hawaii	10320	6350 kHz

All frequencies in kHz, USB mode. Programs may change.

Day/Night are local at the transmitter.

Reports to QSL@mediacen.navy.mil



ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
AWACS	Airborne Warning And Control System
CAMSLANT	Communication Area Master Station, Atlantic
COHEN	Customs Over-The-Horizon Enforcement Network
CW	Morse code telegraphy ("Continuous Wave")
DX	Distant Transmitter
E3	British MI6/SIS numbers, possibly Cyprus
E4	British MI6/SIS numbers, possibly Guam
E6	Russian numbers, in English
E10a	Israeli phonetic numbers, null message
EAM	Emergency Action Message
FAX	Radiofacsimile
FBI	US Federal Bureau of Investigation
FEC	Forward Error Correction teleprinting system
FEMA	Federal Emergency Management Agency
FGS	Federal German Ship
HMAS	Her Majesty's Australian Ship
MARS	Military Affiliate Radio Service
Meteo	Meteorological
M8	Cuban "Cut Number" CW (sounds like letters)
M12	Russian CW numbers, ends 000 000
M16	8BY, French intelligence, CW numbers
MFA	Ministry of Foreign Affairs
NORAD	North American Air Defense Command
Pactor	Packet Teleprinting Over Radio
RSA	Republic of South Africa
RTTY	Radio Teletype
SHARES	Shared Resources
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
V2a	Cuban "Atencion!" numbers, 3-message format
VFT	Voice Frequency Telegraphy
XPH	Russian "Polytone" numbers

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

284.0	GRN-Non-Directional Beacon, Gorna Oryahovitsa, Bulgaria, in CW at 2037. (Ary Boender-Netherlands)
2203.0	MGJ-UK Royal Navy, Faslane, with RTTY channel bulletins, at 2200. (Day Watson-UK)
2813.9	MTI-UK Royal Navy, Plymouth, with RTTY channel bulletins, at 2120. (Watson-UK)
3208.5	Unid-SITOR-B message from "majed abu shaker offshore operations manager," at 1738. (Watson-UK)
3667.2	Unid-Possibly an Egyptian airfield net, with short ARQ tests at 3 minutes after each hour, also a message in Arabic, at 1815. (Watson-UK)
4027.0	Cuban "Cut Number" CW station (M8), with numbers at 0302 and 0402. (Camillo Castillo-Panama)
4241.0	4XZ-Israel Navy, CW traffic in Hebrew, at 2250. (Watson-UK) [Enigma M22 when it runs numbers. -Hugh]
4479.0	Cuban "Atencion" (V2a), with AM Spanish callup 82773 40383 90443, then numbers, at 0403. (Castillo-Panama)
4506.0	Cuban "Cut Number" CW station (M8), with numbers at 0323. (Tom Sevart-KS)
4556.0	WPC-Seawave Radio, with CW identifier in data pulses, at 0714. (Mid-Atlantic DXer-MD)
4700.0	"2kzglobocica"-Polish forces in Kosovo (KFOR), calling

4770.0	"Operacyjnypkw" (Warsaw?), in ALE, at 1805. "1kzdjankovic" calling "Operacyjnypkw," at 1812. (Watson-UK)
5162.0	The English Man-Russian AM numbers (E6), in progress at 2142. (Boender-Netherlands)
5399.0	Russian Intelligence CW numbers (M12), at 2150. (Boender-Netherlands)
5418.0	TZB159-US National Guard, ALE sounds at 0241, 0311, 0513, 0543, 0643, 0714, 0744, and 0945. (MADX-MD)
5418.0	Cuban "Atencion" (V2a), with AM Spanish callup 24492 21463 53413, then numbers, at 0202. Cuban "Cut Number" CW, different day at 0202 and 0320. (Castillo-Panama)
5696.0	US Coast Guard Cutter Diligence (WMEC-616), working Camslant at 1953. (MADX-MD)
5717.0	MKL-UK Royal Air Force, Kinloss, calling "V-1-H," no joy, at 0555. (MADX-MD)
5809.0	Russian Polytone station (XPH), weird tone-coded numbers in AM, null message, at 2120. (Boender-Netherlands)
5860.0	faazma- US Federal Aviation Administration, Miami, FL, ALE sound at 0715. faazdc-FAA, Washington, DC, sound at 0732. faazbw-FAA, Boston, MA, sound at 0739. (Watson-UK)
6586.0	New York Radio, taking positions from flights including American 68, American 62, and Speedbird 208. (Sue Wilden-IN)
6697.0	Stevedore-US military, with an EAM simulcast on 8992 and 11244, at 0611. (Jeff Haverlah-TX)
6768.0	Cuban "Cut Number" CW station (M8), with numbers at 1205. (Castillo-Panama)
6770.0	SIL-Rockwell Collins Systems Integration Laboratory, working COT in ALE, at 0615. (MADX-MD)
6781.0	Russian Intelligence CW numbers (M12), at 2130. (Boender-Netherlands)
6797.0	Cuban "Cut Number" CW station (M8), with numbers, twice at 1203. (Castillo-Panama)
6826.0	Cuban "Cut Number" CW station (M8), with numbers, twice at 1203. (Castillo-Panama)
6854.0	Cuban "Atencion" (V2a), with AM Spanish callup 30022 42781 12553, then numbers, at 0304. (Castillo-Panama)
6865.0	Cuban "Cut Number" CW station (M8), with numbers at 1203. (Castillo-Panama)
6912.0	KPA2-Israeli intelligence, with AM English phonetic "numbers" (E10a), at 0220. VLB2-Israeli intelligence (E10a), AM, at 0250. KPA2 (E10a), AM at 0310. KPA2 (E10a) at 0s15. (MADX-MD)
6913.0	AAA9CE- US Army MARS, Memphis, TN, calling roll of the Command Administration Net, in LSB, at 0200. (MADX-MD)
6981.0	Cuban "Cut Number" CW station (M8), with numbers, twice at 1203, twice at 1303. (Castillo-Panama)
7475.0	faazdc-FAA, Washington, DC, ALE sound at 0351, and hourly thereafter. faazob-FAA, Cleveland, OH, sounding at 0517 and 0622. faazma-FAA, Miami, FL, sounding at 0557. (Watson-UK)
7646.0	DDH7-Hamburg Meteo, with RTTY English Channel weather forecast (stormy!), at 1440. (Watson-UK)
7684.5	NNN0MDC-US Navy/Marine Corps MARS, Washington, DC, calling many stations in Pactor at 0200. (MADX-MD)
7710.0	VFF-Canadian Coast Guard, Iqaluit, with FAX ice charts at 0710. (Watson-UK)
7817.0	T159-Unknown, probably US Military, sounding in ALE at 0214, then at 15 and 45 after each hour. (Watson-UK)
7889.0	Cuban "Cut Number" CW station (M8), with numbers at 1203. (Castillo-Panama)
8122.0	Canberra Control-Royal Australian Navy comm station, working heavy landing ship HMAS Wewak (L-130), at 1210. (MADX-MD)
8335.3	DRAE-German Navy vessel FGS Luetjens, working DHJ 59, Wilhelmshaven, in voice and VFT, at 2300. (MADX-MD)
8912.0	TRC-US Customs Service, sounding in ALE at 2218 and 2303. (MADX-MD) TRC, sounding in ALE at 2239. (Watson-UK)
8930.0	Reach 19-US Air Force Air Mobility Command, at 0357. (MADX-MD)
8965.0	Bandsaw Mike-US military, patching Phoenix 1 at 0021. (Sevart-KS)
8983.0	Air Force Rescue 95829-US Air Force C-130 on search for a lost State Department aircraft, telling US Coast Guard CAMSLANT

Chesapeake of return to base for engine smoke, at 0130. (Allan Stern-FL)

8992.0 Raider 21-US military, checking both transmitters with Assurance, at 0418. (Haverlah-TX)

9016.0 Astra 31-US Air Force, probably a tanker, working Andrews at 0111. (Haverlah-TX)

9023.0 Darkstar Romeo, calling Deer Hunter (NORAD, Western US), no joy, at 0802. Magic 76-US Air National Guard, possibly an F-16, at 0804. (Haverlah-TX)

9025.0 Hawk 66-US military aircraft, calling Vampire 72, at 0403. Reach 6012-US Air Force Air Mobility Command, in a patch to Dover via Andrews AFB, MD, at 2318. (Severt-KS)

9057.0 Darkstar-AWACS aircraft, no suffix heard, in a long, ALE-initiated voice patch to "Maintenance," at 2246. (Haverlah-TX)

9059.6 WBP4562-Vessel Endless Summer, working unid station in Pactor, at 2118. (MADX-MD)

9323.0 Cuban "Cut Number" CW station (M8), in progress at 1031. (MADX-MD)

10204.0 Tricycle-US military, with several EAM, simulcasting on 6697 and 8992, at 0708. Play Ball-US military, with a 28-character EAM, simulcast on 8992 and 11244, at 1606. (Haverlah-TX)

10345.0 Cuban "Cut Number" CW station (M8), with numbers at 0325. (Castillo-Panama)

10586.5 WWJ 98-US Government Federal Agencies Net control, Idaho, announcing that the Mountain Region Disaster Services and Federal Agencies Net would meet every Wednesday at 2100, on 5125 and 7477 kHz. Station then took SHARES check-ins from WGY 916, FEMA, TX, and WGY 998, FEMA, at 1718. (Hugh Stegman-CA)

11175.0 Unid-Station with "easy listening" music from "W???, 105.9," getting complaints from other military stations, at 1257. (Severt-KS)

AX 410-Unknown aircraft, patching Operations via Andrews, at 1723. Tuff 47-US Air Force, possibly a B-52, calling Mainsail and "any station" (same thing), no joy, at 1926. (Haverlah-TX)

11226.0 Sentry 52-US Air Force AWACS, working Raymond 24 (Tinker AFB), at 2346. (Severt-KS)

11232.0 Trenton Military-Canadian Forces, passing weather to an aircraft at 1944. (Severt-KS)

11244.0 Stateroom-US military, with a 28-character EAM, simulcast on 8992, at 1825. (Haverlah-TX)

11432.0 Unid-Long distance trucker chat, between Zimbabwe & Pretoria, at 0600. (Bob Hall-RSA)

11445.0 C07-US National Guard, calling C11 in ALE, at 2032. A11-Same net, calling OPS at 2111, and CDR at 2103. (Watson-UK)

11461.3 Unknown Egyptian diplomatic, with Arabic chatter and testing in SITOR-A, at 1525. (Watson-UK)

11465.0 055-Israeli Air Force headquarters, sounding in ALE, at 0659. 616, sounding at 0733. (Watson-UK)

12111.0 SA2N-Unknown CW station, bad hand sending, working FRV 4889 at 0913. Station appears every 15 minutes, working other stations with calls beginning in "F." (Geoff Halligey-UK)

12138.5 SU1-FBI, Salt Lake City, calling SUP03 (unknown FBI), in ALE at 0636. (MADX-MD)

12215.0 Cuban "Atencion," AM Spanish numbers (V2a), in progress at 0236. (MADX-MD)

12832.5 JFC-Misaki Fishery Radio, working unknown fishing vessel in CW, then back to markers, at 0832. (Watson-UK)

12921.1 MGJ-British Royal Navy, Faslane, with RTTY channel bulletins, in channel 3 of VFT, parallel on 8642.1, at 0439. (MADX-MD)

13155.0 Unknown-Weak station with a 28-character EAM, probably US Navy, at 2244. (Haverlah-TX)

13200.0 Offutt-US Air Force Global High-Frequency System, NE, with a 17-character EAM at 2045. (Haverlah-TX)

13244.2 NNNOEZL-US Navy/Marine Corps MARS, working AFA3HY on the SHARES bulletin-board channel, in Pactor, at 1449. (MADX-MD)

13245.0 Pipe Stem-US military, with 40-character and a 28-character EAMs, simulcast on 8992 and 11244, at 1729. (Haverlah-TX)

13442.0 055- Israeli Air Force headquarters, sounding in ALE, at 0659. (Watson-UK)

13597.0 JMH4-Tokyo Meteo, with FAX wave prognostic chart, showing a typhoon, at 0756. (Watson-UK)

14396.5 WPKJ 542-National Telecommunications Alliance, CA, acting as SHARES Coordination Station, West, taking weekly net check-in from Texas CAP 1090, Civil Air Patrol, at 1530. (Stegman-CA)

14400.0 OLZ69-Czech Embassy, Cairo, Egypt, sounding in ALE at 2329. (MADX-MD)

14422.0 055-Israel, ALE sound at 0753. (Watson-UK)

14535.0 055-Israel, ALE sound at 0725. 619, Israeli Air Force, sounding at 0748. (Watson-UK)

14731.7 RFFAAC-Guerre Dipermil, Paris, with an ARQ message to many units regarding public relations procedures, at 1644. (Hall-RSA)

14718.3 RFHI-French Forces, Noumea, with an ARQ message in 5-letter groups, at 0518. (MADX-MD)

14731.7 RFFAC-French Ministry of Defense, Paris, with ARQ administrative message in French to AIG2133, at 1523. (Hall-RSA)

14913.0 055-Israel, ALE sound at 0750. (Watson-UK)

14931.0 8BY-French Intelligence, Paris (M16), with 3-number groups in CW, parallel on 18415, at 1147. (Severt-KS)

15016.0 Elective-US military, calling Mainsail ("any station"), no joy, at 1715. (Haverlah-TX)

15682.0 Lincolnshire Poacher- UK Intelligence "numbers" in English (E3), at 1214. (Severt-KS)

16014.0 RFFINDI- French Navy, 'Admiral Indian Ocean' command, with ARQ weather at 0635. RFVIC-French Navy, Port Des Galets, with ARQ messages at 0644. RFFTC-French Air Force, with long ARQ messages to frigate Nivoise, at 1032. (Hall-RSA)

16023.0 CMU967-Russian Navy, Havana, Cuba, calling RMP in CW at 1517. (Watson-UK)

16121.7 Unid-Egyptian MFA, Cairo, with ARQ and FEC traffic, may have gone to 15770.0, at 1438. (Watson-UK)

16997.5 WLO-Mobile Radio, AL, with SITOR-B weather and traffic list, at 1402. (Severt-KS)

17488.0 RIW-Russian Navy, Khiva, with encrypted CW traffic for RKZ, at 1037. (Watson-UK)

18003.0 Reach 8H7-US Air Force Air Mobility Command, with a patch to Charleston Meteo via Andrews, at 1705. Sentry 63, US Air Force AWACS, patch to Eagle 2 at 2203. (Severt-KS)

18926.7 Unid- Egyptian diplomatic, with Arabic chatter and sign off in SITOR-A, at 1226. (Watson-UK)

19031.7 Unid-Islamabad MFA, Pakistan, with SITOR-A traffic in English to Paris, at 0954. Also Pakistan embassy, Damascus, Syria, with SITOR-A traffic in English, at 1021. (Watson-UK)

19043.0 055-Israel, ALE sound at 0808. (Watson-UK)

19131.0 Flint 840-US Drug Enforcement Agency, Calling Atlas (DEA, IA), at 2148. (MADX-MD)

20179.7 RFFXOC-French Army, Paris, with long, coded ARQ message to many French and US assets in Indian Ocean, at 1530. (Hall-RSA)

20555.0 RFFX-French Forces, Versailles, with a coded ARQ message from RFGW, Paris, to RFFXL, French Forces, Beirut, at 1453. (MADX-MD)

20946.0 8BY-French Intelligence, Paris (M16), with CW markers and callup 506/663/475, at 1352. (Watson-UK)

21866.0 Cherry Ripe-UK Intelligence "numbers" in English (E4), at 1303. (Severt-KS)

21868.0 Cuban "Cut Number" CW station (M8), with numbers at 1304. (Severt-KS) [Pretty high frequency for them. -Hugh]

22769.0 616-Israel, ALE sound at 0733. (Watson-UK)

24370.0 RFGW-French MFA, Paris, with an FEC embassy circular, at 0915. P6Z-MFA, Paris, calling S5F, Brasilia, in FEC at 1754. (Hall-RSA)

26161.4 CPK-Globe Wireless digital node, Santa Cruz, with Morse ID in sync markers, at 1352. (Watson-UK)

26170.4 CPK-Globe Wireless digital node, Santa Cruz, with Morse ID in sync markers, at 1339. (Watson-UK)

26241.7 RFVI-French Forces, Reunion, with French and encrypted ARQ traffic, at 1104. (Watson-UK)

26441.7 RFFA-French Forces, Paris, with French and encrypted ARQ traffic, at 1325. (Watson-UK) RFFIM-French Navy, Paris, with encrypted ARQ message for RFVIMCR, Le Port, at 1650. (Hall-RSA)

Mike Chace

mike@chace-ortiz.org

Stan Scalsky

sscalsk@mail.ameritel.net

New MIL-188-110A HF Modem Users

This month we look at some newly discovered users of the MIL-188-110A 2400bd HF modem, check some developments within the diplomatic networks operated by China and Egypt and profile the popular Codan modem series.

◆ Czech Diplomatic Service with High-Speed Modem

Early one weekday morning we bumped into the Czech diplomatic service testing their variant of the popular MIL-188-110A 2400bd modem in serial tone mode on 20620.45 kHz.

Using USB voice coordination, the two operators commissioned what appears to be a link from Prague to an as yet unidentified North or South American embassy(s). The embassies in question clearly collect and forward traffic from a number of other Czech missions in the area as evidenced by email headers and documents from Brasilia, Rio, and Havana, among others. Traffic consists of email with Word Perfect document attachments. Unfortunately, no ALE is used, the operators preferring to use a CW or simple voice call-up instead.

Here is an example of the email monitored:

DATA RATE 1200 SHORT INTERLEAVER
BCDEFGHIJKLMNOPQRSTUVWXYZ[]^ '_abcdefghijklmnopqrstuvwxyz{|}'
Pz RP BRASILIA.EEX0STA01—Message:
From: operator at POSTA01
Date: 10/11/01 2:35PM
To: BRASILIA at RPOSTA01
Subject: GK Sao Paulo 1162/2001
Contents:
File item: STAT-SVA.WPD 10/11/01 9:25AM
RPSTAT-SVA.WPD •• cje01öi'e, ••tK+•tK+S"cmM••yyyyP•ej
VA.WPD"ÉCÉ?•
SKceS(yiKS98/TEMP/WORKBACK/STAT-SVA.WPD

Note the interesting lead-in of upper- and lower-case characters in alphabetic order – something noticed on old Czech ASCII-ARQ traffic. This is another reason why knowledge of an organization's old message formats can be useful in identifying their use of a new system.

◆ Mexican Navy using High-Speed Modems

Most Saturday mornings starting around 0800EST on 19106.5 kHz, you can hear the Mexican Navy exchanging traffic using a serial tone MIL-188-110A modem.

Again, there is no ALE triggering the modem activity, but there is chatter among the operators, using a very distinctive unit (also capable of providing voice encryption) which provides a short burst of 4-FSK data (for linking or synchronization) before each over. This unit is becoming popular with military units in a number of countries, but we have yet to discover the manufacturer, although Israel's Tadiran is the most likely suspect.

Here is a (somewhat corrupted) example of

traffic. Note the use of the "XBRH" signature which also happened to have been used as a SITOR-A SELCAL by the Mexicans. Like the Czechs, there is also a distinctive lead-in to each frame of traffic:

#####0123456789NDIENTE PRIMERA QUINCENA SEPTIEMBRE PITE.
AÑO, DEL PERSONAL
CAPITANES Y TITLES. ESA UNIDAD, FUNGEN COMO SERVIDORES PUBLICOS.

—
221230.-VICEALM.CG.DEM.

VELAZQUEZ AVILES.

ERE2216 C/2 RAD. XBRH/XBRE. TB.

◆ Investigative Help Required

As we're sure readers of this column have gathered, we take a serious interest in tracking down networks. This month, we're publishing the details for three ALE networks that have had us scratching our heads for some time. Any help, guesswork or further collection of information will be much appreciated.

Unidentified Network 1

This network would appear to be African in nature – KAM = Kampala?, MOD = Mogadisho?, DRC = Democratic Republic of Congo? – but we're not sure. Clearly voice traffic using Codan radios follows the ALE link-ups but it is always very weak and has so far defied further analysis.

Our best guess is that this is one of a number of "bushnet" systems established by aid agencies in Africa – possibly the World Food Program's DFMS (Deep Field Mailing System).
Identifiers: 12B, 26B, AHQ, DRC, HOD, KAM, KLU, MOD
Frequencies: 8056, 12190, 14360, 14395, 14483, 16360, 17137, 17173kHz USB

Unidentified Network 2

In this network the ALE triggers the Harris AVS (Analogue Voice Security) encryption system, and so is probably being transmitted by Harris Falcon-series radios. The speculation is that this network is located in North Africa.

Identifiers: MQ11, SY11, UJ11

Frequencies: 7996, 12225kHz USB

Unidentified Network 3

In this network the ALE again triggers the Harris AVS encryption system. The identifiers of this network are all Arabic male names, again adding to the possibility that this network is located in North Africa or the Middle East.

Identifiers: ATEF, BADIS, BASSEM, MALEK, MALEK MIM, SAYF

Frequencies: 7635, 11202, 12225, 13242kHz USB

One network previously published here using the identifiers BAHAMAS, MOSCRIP, VIEQUES and others has been identified as being three island bases operated by the US Navy Seabees.

◆ China and Egypt Expand Systems

Adding to their recent move to MIL-188-110A 2400bd modems, the Chinese now appear to be testing a new variant of the Russian CROWD-36 multitone system. The Chinese version is recognizable by much wider tone spacing and lack of the 10+11+11 tone groups.

Meanwhile, the Egyptian Diplomatic Service has been extensively testing the Codan series 9100 16-tone modem over here in the US. The embassies in Washington and Havana have been heard exchanging traffic with Cairo using the new modem, with coordination on USB voice and changing back to the old SITOR-A system to close the link. Codan activity was logged on 19056.5 and 20661.5 kHz – the corresponding SITOR-A being 0.2 kHz higher. No ALE appears to be used in either case, although the proprietary chirp has been heard.

◆ System Profile: Codan

The Australian Codan radios and modems have been a staple of many organizations working in tough environments (particularly Africa) and needing the security and reliability of good communications. Codan gear is being used by oil companies (LASMO/Ein), aid agencies (Mission Aviation Fellowship, Red Cross and Red Crescents) and many MOI operations (Angolan Police) throughout the world.

This reputation seems to have been noticed in the diplomatic community where the company's 9100-series modem has been noted under test by both Egypt and Pakistan.

The 9100-series modem's signal can be seen as a series of 16 QPSK channels, approximately 112 Hz apart ranging from +656 to +2343Hz. The modem can reach speeds of up to 6000bps under optimum conditions. Codan's proprietary 100bd SELCAL and 80bd chirp can be used for station addressing and automatic best channel selection, but this is frequently replaced by the more usual MIL-188-141A ALE.

◆ New Gear Arrivals

By the time you read this column, it's likely that Hoka will have launched their new decoder – the Code332. This unit operates under the Windows operating system and will apparently require just a standard PC sound card. See the Resources section for some nice screen shots.

Resources

Codan – <http://www.codan.com.au/radcom>

Codan 9100 Audio Clip – <http://rover.vistecprivat.de/~signals/WAV/CODAN16.WAV>

Codan 9100 Audio Clip – <http://rover.vistecprivat.de/~signals/WAV/CODAN-CHIRP.WAV>

Hoka Code 332 – <http://hoka.defiant.co.uk/>

Glenn Hauser

P.O. Box 1684-MT, Enid, OK 73702

wghauser@yahoo.com

www.angelfire.com/ok/worldofradio

Two Militia Broadcasters In Shootouts, One Dead, One Missing

Steve Anderson of United Patriot Radio (6900 kHz) shot up a police car which stopped him for a traffic violation in mid-October, barely missing the cop's girlfriend who hit the floor in the back seat. Then he fled into the mountains of Kentucky, and was not found or heard from in the following month, despite a \$5000 reward. He had threatened to kill a reporter who had written stories about him. Anderson could be hiding out with sympathizers, but was also reported to be suffering from a heart condition (per numerous articles in the *Somerset Commonwealth-Journal*, *Lexington Herald-Leader*, *Louisville Courier-Journal*).

Eagar, Arizona - One of the country's most influential militia radio broadcasters was killed early Nov. 6 in a hail of gunfire when law officers tried to arrest him on a warrant accusing him of aggravated assault. William Milton Cooper, 58, whose apocalyptic, SW radio programs were a major influence on Oklahoma City bomber Timothy McVeigh, was shot to death after Cooper shot and critically wounded an Apache County sheriff's deputy who had tried to arrest him, officers said.

The officer, Robert Martinez, 40, was listed in critical condition at St Joseph's Hospital and Medical Center in Phoenix. Apache County

Sheriff Brian Hounshell said Martinez, a former Marine and Persian Gulf War veteran, was shot twice in the head by what was believed to be a .45-caliber pistol.

Cooper had been indicted on federal charges of failing to pay taxes from 1992 to 1994 and became a fugitive after failing to appear for a U.S. District Court hearing in Phoenix three years ago. Glenn Jacobs, a Round Valley newspaper publisher and friend of Cooper, said he didn't think the police operation was unjustified. "I think Bill just went nuts. He was looking for martyrdom anyway and swore he would never surrender," Jacobs said. "They had him dead to rights on aggravated assault." (Mark Shaffer, *The Arizona Republic*, Nov 7, via Larry Van Horn)

Cooper's death was devastating to his friend Allan Weiner, who planned to keep airing reruns of *The Hour of the Time*, UT Tue-Fri 0300-0400 on WBCQ 7415 (gh)

High Frequency Coordinating Committee

B-01 frequency schedule is a very useful reference, more up to date than any reference books; via <http://www.hfcc.org/data/index.html> where previous editions are also available (gh)

AFGHANISTAN As soon as Kabul was liberated, local radio broadcasts resumed, and workers reinstalled a Radio Afghanistan sign, but not on SW; hams tried to prevent reactivation on 7087v. Before jumping to conclusion that you have Kabul reactivated when something is heard on 4775, note that TWR Swaziland uses the frequency at certain hours, otherwise of no consequence (gh)

[non] A Popular Communications contributor sent a nastygram in September to Afghan Radio and was surprised to receive an E-mail reply denying they were pro-Taliban, and indicating that there were Americans working at the station. This longstanding "station" at <http://www.afghanradio.com> is not in Kabul, but is run by exiles and immigrants in the USA, also on the air in Washington DC and the Bay Area (gh)

The 8700-USB Information Radio transmissions may have come from Turkmenistan, an unlikely ally with a low profile through the crisis. Evidence included fading patterns and a brief exchange in the Turkmen language recorded on the frequency (Nick Grace, *Clandestine Radio Watch*) In a reply to many DXers who had E-mailed reception reports of Commando Solo on 8700, Lt. Edward Shank replied Nov 7 from edward.shank@paharr.ang.af.mil that he was touched by all the reports, but was not yet authorized to authenticate them or reveal details of the operation (via E. A. Wembacher, Argentina, CRW)

ANTARCTICA Radio Nacional Arcángel San Gabriel is still on the air! It was received October 18 at 2050 on 15476. Base name "Esperanza" was mentioned twice (Vladimir Kovalenko, Tomsk, Russia, *DX Listening Digest*) This is to remind you that station is rumored to be closing early in 2002, so hurry up and get it, M-F 1800-2100 (gh)

ARGENTINA RAE B-01 English added second frequency: M-F 1900-2000 Eu 9690 15345; Tu-Sa 0200-0300 Am 6060 11710 (Gabriel Iván Barrera, *Conexión Digital*) RAE was on exactly 11710.00 UT Nov. 8 0130, then exceedingly long multi-lingual ID sequence at 0159. Hammered by slop from RHC's sideband transmitter on 11705, but still very good signal, stronger than usual, and dead-on frequency! What's going on? (Randy Stewart, MO, *DX Listening Digest*) 11710 blasted as usual by Cuba 11705-USB, and 6060 hit by Spain 6055 and someone Arabic (Bob Thomas, CT)

AUSTRALIA HCJB has an international broadcast license. The station planned in Kununurra WA could blanket India and China; within a 2-hop range is more than 60 percent of world population in 10-40 latitude range. Still much to do. Target date Xmas 2002, the 71st anniversary of HCJB in Quito (David Maindonald, HCJB-Australia on HCJB DXPL)

Christian Voice, now owning the R. Australia transmitters near Darwin, has renamed itself Voice International Limited. (via

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-01 = winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

Dr. Hansjörg Biener, BC-DX)

AUSTRIA Radio Africa International via Moosbrunn 1100-1200 English/French on 17815 (Silvain Domen, Belgium, *DX Listening Digest*) It's not the Methodist show. Announced as daily 1100-1200 17815 via Moosbrunn; 1500-1600 17895 via ?; Sundays: 1900-2000 5945 and 6155 via Moosbrunn; on the net <http://www.radioafrica.net> In English, French, German. Stories, travel reports etc. Also via FM-Orange in Vienna, so it's a relay via shortwave (Silvain Domen, Belgium, DXLD) This turns out to be program mentioned in an ORF press release as "Tribüne Afrikas," also on 1476 daily 2200-2300. 1100-1200 on 17815 and 1500-1600 on 17895 in ORF technical schedule. Evidently a Vienna-based project which simply does not know about the "Radio Africa International" of the United Methodist Church (Kai Ludwig, DXLD)

BELGIUM [non] Last-minute change in RVI via Bonaire, English at 2230 even before it went into effect: 13700, not 13685 (Frans Vossen, RVI Radio World via John Norfolk, DXLD)

BHUTAN BBS Thimphu changed English schedule. Local time is UT +5.30 [like India] instead of UT+6. New programs include *Internet On Radio* Sun 1100-1130 (extended English 1000-1130 at the weekend). Unfortunately morning English is retired at 0500-0600 (instead of 0300-0400) and reception at this time is very poor even here in Calcutta. English also 0800-0900 M-F; All on 6035 kHz. M-F 0100-0600, 0800-1230; Sat/Sun 0400-1130. E-mail addresses announced: for request program: request@bbs.com.bt For *Internet On Radio* program: browse@bbs.com.bt Home page is: <http://www.bbs.com.bt> (Alok Dasgupta, India, *DX Listening Digest*)

BRAZIL Rádio Difusora de Poços de Caldas, 4945: <http://www.difusorapocos.com.br> Due to energy rationing, schedule limited to 0700-1000, 1600-2200 (Marco Antonio Archanjo, Sorocaba, SP, *Radioescutas*)



BULGARIA Radio Varna ("Hello, sec"/"Zdravey, more"): 2200 Sunday-0400 Monday on new 9800, 100 kW, non-dir, ex 9955 (Observer, Bulgaria)

CAMBODIA Phnom Penh, is again active around 11940.3v, according to previous schedule, still very bad modulation (Roland Schulze, Philippines, BC-DX) 11940.34,

Phnom Penh with lovely smooth SE Asian music 1240-1314, very low modulation, but Bucharest fortunately not using 11940 at this time (Wolfgang Büschel, Germany)

CANADA Contrary to last month, RCI features are now: Mon Media Zone; Tue Maple Leaf Mailbag; Wed Spotlight (arts); Thu Business Sense; Fri Canada and the World (each also repeating on weekends). Media Zone, hosted by Ian Jones, is a weekly forum

where Canadian journalists meet to express their ideas about topical issues facing Canadians (via gh)

CHINA Joining 21 MHz community now?, at least to jam Mandarin/Cantones/Tibetan of RFA and other western broadcasters in the 13 meterband. Up to now, China used 90 to 16 mb only, never heard on 21 MHz (Wolfgang df5sx Büschel, *DX Listening Digest*) The bands are beginning to fill up with Chinese, just as they were full of Russians 15 years ago. Checking 1930-2130 I have spotted at least 10 new highpowered signals. A problem is that all three programs heard are also used by jammers. The nonstop music service is used by many jammers when CNR-1, CNR-2 are sleeping. 9480, 9760, 11700, 11740, 11785, 11850, 11935, 11990, 12010, 13610, 13750, 13775, 15160, 15195, 15355, 15520, 15545, 15600, 15695, 17640. Apart from 17640 these appear to originate from a single site (Olle Alm, Sweden, BC-DX)



Asian Broadcasting Institute has CRI schedule in time order, including English, showing the Canadian, Cuban relays correctly, as well as specifying other transmitter sites, even within China: <http://www.246.ne.jp/~abi/sked-chn.htm> (gh)

[non] Clandestine, Falun Dafa: 2100-2200 on 5925, 9445 (Ludo Maes, Belgium, TDP, BC-DX) Perhaps Irkutsk and Tajikistan respectively (BC-DX)

COLOMBIA New station in Bogotá on 7380 heard at 2230-0100, including English ID as Idea Radio (Bruce, Nov 3, swl@qth.net) Mixing with VOR Spanish to LAm, so not a good choice; clear when rechecked at 1024 during tropical/romantic vocal music in Spanish, and 1028 ID in English. Fading a bit but still audible at 1150 with continuous music sequés of upbeat tropical music, except for canned IDs in English at approximately 1101 and 1130, Spanish at 1121 and 1144: "This is Idea Radio, a shortwave station from Colombia to the world. Idea Radio broadcasts on 7,380 kHz. For more info, please contact us: P. O. Box No. 2-5-7-3-3, Bogotá, Colombia, Sudamérica, or e-mail us: idearadio@hotmail.com" This one surely came out of nowhere! The first Colombian broadcaster ever on 7 MHz band (Glenn Hauser, OK, *DX Listening Digest*)

Male ID speaker has a foreign accent and female is fluent in Spanish. In almost 5 hours of monitoring, I heard only three themes interpreted by Colombian artists. Although the vallenato is Colombian style, I was unable to identify one single theme or interpreter. The signal is strong, and they appear to be on the air all night. The PO box ought to be at Chapinero post office (Rafael Rodríguez, Bogotá, via Henrik Klemetz) The name Idea Radio and frequency 7380 were formerly used by a pirate in Genova, Italy, who had to flee the country to Colombia (Dario Monferini, DXLD) Our hearing it as late as 1230 UT rules out a European location now. Aware of the clash with Russia on 7380, one night he tried 7415, but that clashed with WBCQ; in the clear however, at 1230 (Glenn Hauser, OK, *DX Listening Digest*) DFing shows it to be near Barranquilla (Dan Ferguson, Cumbre DX)

COSTA RICA Radio For Peace International and the International Center for Human Rights in Media present a 10 week study course dealing with social justice, human rights, ethics in journalism, researching and documenting intolerance in media, researching and preparing articles for publication, radio and news production with elective Spanish language training. Students live with a Costa Rican host family. Four overnight excursions, special activities included. Session start dates for 2002: Jan 6, March 24, June 9, September 1. Contact: IPC, SBO 66, P.O. Box 025292, Miami, FL 33102. Tel: +506-205-9092, FAX: +506-249-1095 or <http://www.rfpi.org/ipc.html> (RFPI)

To avoid Taiwan on 15050, RFPI moved to 15040, about 1300-1000, awaiting reactivation of 7445 with new antenna, around 0300-0700.

Internet streaming direct from RFPI will probably run only from 2200 to 1300 or 1400 UT, when bandwidth is available. Those who would like to join Friends of RFPI, may do so with Visa or Mastercard M-F 1500-2300 UT via 1-800-413-7695 (James Latham and Joe Bernard, RFPI Mailbag)

CROATIA [non] CRZ 0400-0559 to WNAm, 320 degrees, via Germany replaced 9885 with 7285 (Kai Ludwig, Germany) Still \\\9925; required due to VOA on 9885, but 7285 is in US hamband! (gh)

CUBA [non] Why is the number of Cuban exile broadcasters declining? During the Clinton administration, exiles had little hope for Castro to go away. Nor did he with the fall of Communism elsewhere. Recently, the economic situation has been the principle cause. When Alpha 66 discontinued, it was literally a choice between continuing to broadcast on SW or continuing to rent space for their office. With the Cuban American National Foundation, their recent abrupt decision to end SW after 12 years was due both to internal conflicts and money. The *Miami Herald* reported that the Foundation had been largely operating from a fund that founder Jorge Más Canosa left when he died. It was in shares of stock in his very successful telecommunications company, MasTec. That was fine until the bottom fell out of the stock market. Cuban exile broadcasting is at its lowest point since at least 1989, when Radio Miami began operations first as a broker, operating our own station. Also during the past 10 years, many of the charismatic leaders of the Cuban exile community have died. (Jeff White, WRMI, via Hans Johnson, Cumbre DX)

Radio Martí Director Under Investigation. Roberto Rodríguez-Tejera, Director of Radio Martí – who has been on permanent leave since OCB Director Salvador Lew took over operations, and allegedly made it clear that he was unwilling to work with him – is according to sources under investigation. Washington investigators were at the Miami compound questioning the staff (including his cronies) about Rodríguez-Tejera's alleged activities (From: <http://www.cubapolidata.com/rmo> via Mike Terry, BDXC-UK)

Dominican Republic R. Barahona, 4930, has been perfectly readable, but modulation varies, 1006-1058 (Hans Johnson, FL, *Cumbre DX*)

ECUADOR B01 HCJB times for the 30 minute *Dx Partyline*: To Europe Sat 0700 and 2000, to the South Pacific Sat 0700 and 0900, to India UT Fri 2330; to North America at UT Sun 0100 (east) and 0400 (west). *Ham Radio Today* shortened version during the Wednesday *Studio Nine* at the times above on weekdays; also: Mon, *Inside HCJB*; Tue & Thu, *Did You Hear?*; Fri, *Música del Ecuador* (John Norfolk, OKCOK, DXLD)

EGYPT R. Cairo and its listeners were suddenly confronted in mid November with The Overcomer, Bro. Stair, overriding its only frequency in English to NAm at 0200-0330, 9475, where it has been for sesquidecades. The USAF required WWCR to vacate 7460, so WWCR extended 9475 until 0400; also clashing with Cairo in Spanish to NAm at 0045-0200, per schedule via Alokesha Gupta (gh)

ERITREA The weekly radio program of UNMEE (the United Nations Mission in Ethiopia and Eritrea) has been suspended by Radio Eritrea. Started at the beginning of 2001, not aired since 24 October (© Radio Netherlands Media Network)

[non] Clandestine: Voice of Democratic Eritrea, Voice of the Eritrean Liberation Front – Revolutionary Council (Tigrinya "Demtsi Democrasiyat Eritrea"; Arabic "Savt Eritrea al-Dimuqratiya - Savtu Jabhat al-Tahrir al-Eritrea") was first observed on 21st November 1997. The radio is hostile to the government of Eritrea. It is believed that Voice of Democratic Eritrea originally broadcast via a transmitter in Sudan which was shared with other Eritrean opposition radio stations including Voice of Truth. The broadcasts via Sudan were last heard sometime in 1999. Since June 2000, via hired a Deutsche Telekom transmitter. In Tigrinya, Sat 1400-1500 to Eu on 5925; Mon and Thu 1700-1800 to Af on 15670; on demand archive audio: <http://www.meskerem.net> (© BBC Monitoring)

ETHIOPIA [non] Deutsche Telekom schedule shows new broadcasts from Tigrean International Solidarity for Justice and Democracy on Wed and Sat 1600-1629 on 15700 (Jülich, 125 degrees) (Kai Ludwig, Germany)

FINLAND Radio Finland in English: 0730-0758 9510 Europe, Asia, Australia, 21670 kHz Asia, Australia; 1330-1359 15400 and 17660 North America (Radio Finland website, via Daniel Sampson)

FRANCE "Couleurs Tropicales," a M-F program of African and Caribbean music on RFI, retimed two 20-minute segments to 2010 and 2040 on 9790, 11955, 15300 (Mike Cooper, GA, *DX Listening Digest*)

[non?] Weak NBFM feeders in French heard when 11m reception from Europe has been excellent at local sunrise, peaking at 1230 on 25925 and 25928 (David Hodgson, TN, *DX Listening Digest*) 25925 monitored briefly with Parisien French at 1350, but not when propagation favored Europe. Could be from a French overseas department in Caribbean, or Africa (Alan Roberts, QU, via Sheldon Harvey, DXLD) Always many signals all piled up, making usable audio very difficult. I was able to rule Africa out due to much European radio traffic in 25 MHz range, yet absolutely no African or Caribbean traffic. Caribbean does not usually open here in SE USA on 11m till an hour or two after sunrise. I am receiving these signals right at sunrise to 90 minutes after sunrise.

Also, unlike the pileup around 25925, a single wideband FM TV feeder station in French heard 1310-1345 on 26143-26150. An obvious TV cue station. I can hear technicians talking over the feed from time to time; sometimes I can hear a phone being dialed, ringing, then conversation superimposed on the feed audio. Program consists of news, commentary, small talk and ads (David Hodgson, TN, *DX Listening Digest*)

GREECE ERA5 sent NAm schedule as: 0000-0550 7475, 1200-1500 11900, 1600-2200 17705 (Petro Giannakopoulos, Atlanta, *DX Listening Digest*) So only one evening frequency designated for us now; it's direct, the other two Delano. Weekly hour in English, *Hellenes Around the World* confirmed now at 1700 UT Sat on 17705. Same 100 km/hr YL announcer, has finally learnt to pronounce it "hel-EENZ" instead of previous "HELL-uh-nuzz". It's Greek to Me music show announced in English on Sundays, is at 1900 on same (gh) Also try these for the Atlantic Ocean: 0000-0400 12110, 0400-0600 9420, 0600-0800 15630 9420, 0800-1000 15630, 1100-1200 15630, 1200-1850 15630, 1900-2400 7475. And for SAm, Panamá Canal and SW Africa: 2000-2200 17565 [Greenville], 2300-2400 12110 (via F. Brazhnikov via Wolfgang Büschel)

INDIA AIR GOS B-01 in ENGLISH:

1000-1100 15260 Sri Lanka, 11585 15020 17800 NE Asia, 13700 17510 17895 Australia NZ
1330-1500 11620 13710 SE Asia
1745-1945 7410 11620 Europe, 11935 13605 15155 17670 Africa
2045-2230 7410 9650 11620 Europe, 7150 9910 11715 Australia NZ
2245-0045 9705 9950 13605 Asia

To receive this info from All India Radio, please send a request to dx_india@rediffmail.com : E-mail address list; B-2001 Complete SW Schedule (Home & External Services) in Frequency Order; B-2001 External Service Schedule (Language Order). I also invite you to join dx_india@yahoogroups.com which deals exclusively on Broadcasting in India. E-mail dx_india-subscribe@yahoogroups.com (Jose Jacob, *DX Listening Digest*)

IRAN VOIR English to NAm at 0030 is poor to fair on 6065, but wiped out at 0100 by WYFR, also splashed by 6070 CFRX and 6055 Madrid. 6135 hit by 6145 NHK via RCI or 6130 VOA (Bob Thomas, CT)

For official contradictory version to schedule below see <http://www.iri.com/worldservice/time%20table/frequenci/english.htm> (gh)

B-01 Voice of Islamic Republic of Iran /IRIB/:

ENGLISH (RADIO SHALOM)
2000-2027 7175 7255 (ex 1900-1927);
0030-0127 6065 6135;
1100-1227 15385 15480 15575 21470 21730;
1530-1627 9605 11775 11870;
1930-2027 6110 9890 11695 15140;
2130-2227 9780 11740.

Shortwave Broadcasting

Deleted traditional 9022 for several languages at 0630-0727, 1600-1727, 1830-0127 (Ivo and Angel!, *Observer*, Bulgaria, Nov 13, *DX Listening Digest*) Hardly coincidental, 9022 now designated for US military usage! (gh) Air/ground facility changed Bann-BH station (call sign: Metaphor) provides HF voice frequency support to all US aircrews, ground stations, on 6730 and 9022, 0500-2100Z (WUN via Dick van der Knaap, *BDXC*)

KOREA SOUTH [non] RKI relays via Sackville not only added 0200-0300 on 9560, but enlarged morning prebeat to an hour, 1130-1230 on 9650 (via Bill Matthews, OH) Resultantly, Multiwave Feedback half an hour later Sun 1205 as well as UT Mon 0235 (gh)

LAOS Lao National Radio, Vientiane, External Service, is on 7145 at 1130-1400* including 1330-1400 English. Also 2300-0030* French and English. Very informative local and international news, also local reports, folk music. Every segment ends with National Anthem and ID "That is the Lao National Radio, broadcasting from Vientiane, the Lao Democratic Republic." Also jamming can be heard on 7145, but not sure if aimed at Laos (Roland Schulze, Philippines, *BC-DX*)

LITHUANIA R. Vilnius, English to NAm at 2330 on 9875, 0030 on 7325 (Sigitas Zilionis, Vilnius, *DX Listening Digest*)

MALAYSIA Two spurs noted from V. of Malaysia, Kajang on 15294.905, on 13.635 kHz either side, symmetrically on 15281.27 and 15308.54 (Wolfgang Büschel, Germany)

MÉXICO XERLK, Súper Stéreo Miled, Atlacomulco (harmonic 2 x 1170) at 1035-1127, popped up on 2340.00 out of nowhere with an ad string and good ID right at TOH! (Mark Mohrman, VT, *DX Listening Digest*)

NICARAGUA Personal letter of Sept. 13, 2001 from Evaristo Mercado P., Director, Radio Miskut, says they are now operating without problem on 5770 kHz and 104 MHz FM at 1200-0000 GMT. 3 kW amplifier has not been installed, because it interferes with telephones and TV around 50 sq.m. Now looking for new transmitter site at suburban area. They also operate radio stations in Sandy Bay Norte (10 watts on FM) and Waspan (110 watts on 1680 kHz), thanks to help from Dr. John Freeman (Tetsuya Hirahara, Japan, *Radio Nuevo Mundo*)

NIGERIA Voice of Nigeria heard on 15120 Oct 19 at 0910 with Arts programme, at 0915 news feature Nigerian letter. Strong signal on clear channel but some distortion (Mike Barracough, UK, *DX Listening Digest*) Long awaited reactivation, as external service revives (gh) 15120 at 0700-0900, fair/good here in Germany (Thorsten Hallmann, Münster, DXLD) VON also scheduled 1900-2300 in English on 15120, but clashes with Cuba and WYFR (gh) On 29 October VON officially commissioned three new 250 kW SW transmitters. Radio Netherlands' Eric Beauchemin has just visited the station, and shares his impressions at: <http://www.rnw.nl/realradio/features/html/nigeria011101.html> (Media Network via John Norfolk) With illustrations, captions, sidebars and links including some audio files! (gh)



Photo Credit, Radio Netherlands

Transmitters they just "officially commissioned" are in fact some five years old. The purchase of these Thomcast rigs was widely reported then, and 15120 returned to air temporarily, allegedly from one of these transmitters, so it seems they were indeed delivered and installed. I wonder if "the new Voice of Nigeria" is just the next short-lived passion (Kai Ludwig, Germany)

[non] New schedule received from Salama Radio: 12025 at 1900-2000: Sun, Mon, Wed, Fri, 1900-1930 Hausa, 1930-2000 English; Tue, Thu, Sat 1900-1920 Hausa, 1920-1940 Fulfulde, 1940-2000 English (Jacob Abdalla, Salama Radio via Erik Køie, DXLD)

PERÚ Radio Oriente, Yurimaguas at 2310, very strong signal but unclear and impossible to stabilize in SSB on 6410 // 6634, Maybe Oriente also on 6643 and 6423 where I have noted stations with similar problems. Listed on 6188w where it was off air. Announcing 6190 (Björn Malm, Quito, Ecuador, *SW Bulletin*)

Radio Altura, Cerro de Pasco, on new 5009.3 but announcing 5010, heard at 0020-0130 with folk music (Rafael Rodríguez, Colombia, *Conexión Digital*) 5009.46, 1020-1031, Andean vocals, canned announcements into live announcers with IDs at 1030. Fair to good (Mark Mohrman, VT, *DX Listening Digest*)

POLAND R. Polonia, B-01 in English:
1300-1359 11820 9525 7270 6095
1800-1859 72855995
2030-2129 9540 7165 7290 5995
(Website via Alan Roe, *DX Listening Digest*)

Radio Polonia's media program announced that management has been considering shutdown of SW transmitters. Many complaints about quality of SW signals have been received. Transmitters are property of Polish Telecom so Radio Polonia has no influence on quality. Would be too expensive for PR to buy the transmitters and upgrade. Transmission costs are one third of budget anyway (Mike Barracough, England, *DX Listening Digest*)

PORTUGAL RDP's new 300 kW transmitter plus two curtain arrays for Europe & Brazil is expected to be delivered in Jan 2002, and is due to start operation in June/July. Furthermore, 2 more 300 kW are planned to start operation by 2003 (Carlos Gonçalves, Portugal, *BC-DX*)

ROMANIA RRI has made some more bad frequency choices. For 0200 English to NAm, 9550, heavy clash with Havana in Spanish, which has used that frequency for a long time, Havana on top here, but both unlistenable. At 1400, 17790 clear but weak and undermodulated; 15365 had ACI, and 11940 CCI. The domestic service relay in Romanian is back on 17720, now clashing with China via Cuba (gh) Great sounding transmission from RRI, English at 0400 on 11830; also to WNAm at 0600 on 9530, 11830 (Bob Thomas, CT, *DX Listening Digest*)

RUSSIA Have you noticed the "new" V.O.R. interval signal? It sounds like the old one played at half speed. Wait a minute... it IS the old one played at half speed.

What's up with that? Heard on 12020 at 0258 (Dave Hughes, MO, *DX Listening Digest*)

SPAIN Radio Exterior de España, English: Africa 2000-2059 M-F, 2200-2259 Sunday on 9595; Europe 2000-2059 M-F, 2200-2259 S/S on 9680; America 0000-0159, 0500-0559 6055 (REE website via Daniel Sampson)

SUDAN [non] Really nice personal letter in English from Sudan National Alliance/Sudan Alliance Forces. Secretary Amir Babkir confirms 6985, 10 kW. Address: SNA/SAF, Culture and Information Office, Neguse St. No. 6/8, Asmara, Eritrea (P O Box 9257). New temporary e-mail: pmbsaf@gemel.com.er (Björn Fransson, Sweden, *DX Listening Digest*)

TAIWAN V of Asia will QRT Jan 1, 2002 (Miller de Taiwan, *WWDXC, BC-DX*)

TIBET [and non] I have been monitoring Voice of Tibet for a number of years and the Chinese have been getting more and more ruthless in their jamming. Unlike VOA or BBC, VOT changes frequencies to avoid jamming. A couple of years ago it took the Chinese a week to 10 days to find the new frequency and the first day it came on we moved. However, the Chinese have new jamming equipment and better guys on the job. Now they find the frequency within a few minutes. The VOT has been found transmitting in Tibetan at 1215-1245 and in Chinese 1245-1300, between 15600-15750, 17500-17900 and 21500-21600. Jamming is of three different types. Strong noise jammers, distorted Chinese domestic service, and cochanneling with the CPBS minority service and Chinese services. The VOT tuning signal is quite exotic (Victor Goonetilleke, Sri Lanka, *Clandestine Radio Watch*)

TURKEY V of Turkey in English, B-01:

0400-0450	6020*, 7240;
1330-1420	17690, 17815;
1930-2020	7125;
2130-2220	9525;
2300-2350	9655*, 9830 [*NAm] (Observer, Bulgaria)

TURKMENISTAN Turkmen Radio in English found by Mauno Ritola, Finland on 5015 at 1300-1310: "Welcome to the English programme of Watan [Fatherland] Radio channel. Now I'll present the latest news around the nation." (Bernd Trutenua, Lithuania, *BC-DX*)

UKRAINE RUI has picked a poor frequency for its megawatt to NAm, 7375, a hefty mix with DGS Costa Rica, which has been on that frequency for years; low rumble caused by CR being slightly off frequency. RUI unlistenable (gh) Only two of all nine RUI transmitters put in operation Oct 28, Mykolaiv on 7285, 7375 kHz. Transmitters in Brovary (Kyiv) and in Taranivka (Khar'kiv) were turned off. Then some of them were switched to relay V. of Russia (A. Yegorov, RUI via *WWDXC* via Kai Ludwig)

UAE Dubai, 21605, off-frequency to 21597.6 including English 1600-1633* with poor audio (Bill Westenhaver, QB, *DX Listening Digest*) 21597.63 with English news 1330-1334, then feature program (Wolfgang Büschel, *BC-DX*)

USA I asked the folks in Washington if I was OK to do QSLSing for the whole VOA/IBB system. The answer was yes. So, I am free to handle reports for any site. The address is: John Vodenik, IBB/VOA Delano Transmitting Station, 11015 Melcher Road, Delano, CA 93215 (John Vodenik, CA, *DX Listening Digest*)

On WRNO's old frequency, 7354.4, contemporary Christian music, and IDs mentioning K-love 89.1 FM, New Orleans, before 0300, then het clashing for two hours with WYFR 7355.0 Russian (George Thurman, IL, *DX Listening Digest*)

USAF took 7460 away from WWCR, requiring schedule adjustment for Bro. Scare transmitter #4 to: 0400-0700 2390, 0700-0400 9475 [see EGYPT]; and consequently #1 to: 1100-2200 15685, 2200-0700 3215, 0700-1100 3210 (WWCR) Affects Mundo Radial, some WOR broadcasts

6520 Harmonic, KCJJ (4 x 1630), Iowa City, IA, at 1035 with positive audio match, numerous IDs. DX this one before Pyongyang occupies 6520 after 1100 (David Hodgson, TN, *DX Listening Digest*)

Second harmonics heard: 2260.00, WLBA Gainesville, GA (2 x 1130) 1040-1102 Spanish announcer with ID, "La Favorita" and "Música Mexicana" slogans. Fair signal with good peaks. On 2479.98, WGVA, Geneva, NY (2 x 1240) 1018 Talk and ads, mention of "Art Bell", "Finger Lakes News Network", 1100 ABC net news. Fair to good peaks.

On 2780.02, WRIV, Riverhead, NY, (2 x 1390), 0958-1138, Music, talk and ads, 1115 "Hometown Station" slogan, ID, local weather. Fair signal with good peaks (Mark Mohrman, VT, *DX Listening Digest*)

UZBEKISTAN R. Tashkent heard in English on 25m until 2200* on a hombrew converter while riding my bicycle, Uzbek culture and traditional music (Steven Zimmerman, WI, *DX Listening Digest*) That would be 11905, also audible here on fixed receiver (gh, OK) English at 2030 and 2130 on new winter frequencies 7105, 5025, 11905 (Büschel, Germany, *DXLD*)

Radio Tashkent in English:

0100-0130 As	5.955 5.975 7.215
1200-1230 As	5.955 5.975 6.025 9.715
1330-1400 As	5.955 5.975 6.025 9.715
2030-2100 Eu	5.025 11.905
2130-2200 Eu	5.025 11.905

(© BBC Monitoring)

VIETNAM [non] VOV added relay via Merlin, Austria: 5955, 1800-2000, 100 kW, 320 degrees (via Wolfgang Büschel, *DXLD*)

YUGOSLAVIA R. "Yugoslavia" winter sked: ENAm 0100-0130 exc Sun on 7115; Daily: WNAm 0200-0230 on 7130. Au 1330-1400 11835. Eu 1930-2000 and 2200-2230 on 6100 (Bob Thomas, CT, *DX Listening Digest*)

The 0200 broadcast clashes with DW Wirtschaft also on 7130 at 0000-0400 (gh)

Until the Next, Best of DX and 73 de Glenn!

0000 UTC on 9745

ECUADOR: HCJB. Station ID and frequency quotes, to evening devotional programming. (Tom Banks, Dallas, TX) Religious text on 21455 USB, 0645. (Zacharias Liangas, Thessolinkiki, Greece/*Hard Core DX*) **Ham Radio Today** 17660 at 1945. (Bob Fraser, Cohasset, MA) Presumed Ecuadorian **Radio Federacion** 4960 at 2300-2310. SINPO 23222. (Michael Schnitzer, Hassfurt, Germany/HCDX)

0005 UTC on 13565.4

PERU: Ondas del Pacifico. Harmonic reception from normal 6782.7 frequency x 2. Music program and greetings to listeners. Announcement as, "como voy a hacer para olvidarte, por el grupo chocolate con leche" to time check. Peru's **Radio Cora** 2334 on 4914.8 with music program of cumbias and romantic ballads. **Radio La Hora** 4855.6 at 2325 with soccer commentary. Local ads, 24332 SINPO. (Arnaldo L. Slaen, Buenos Aires, Argentina)

0005 UTC on 7580

USA: WHRA. National news to *Unraveling the New World Order* segment. US stations audible; **VOA** 9455 at 0017 with Asian and Colombian news topics; **WHRI** 6040 at 1258 with IDs and *Politics & Religion*. **Radio Marti** in Spanish, 13820 at 1432. (Sue Wilden, Noblesville, IN). **VOA** newscast from **Sao Tome** relay 4960 at 1930. (Liangas, GRC/HCDX)

0135 UTC on 15425

LIBYA: Voice of Africa. News coverage on the *Leader of the Revolution* (Khadafi?) meeting with various envoys from Venezuela and Madagascar. Condemnations of Afghanistan bombings to Anthrax headlines. French service 0140 to 0148. (Bob Stewart, Hamilton, Ontario, Canada/ODXA)

0230 UTC on 9965

ARMENIA: Voice of Armenia. Closure of Armenian service. ID, national anthem to frequency quote and regional news. (William Mc Guire, Cheverly, MD)

0300 UTC on 9640

PORTUGAL: Deutsche Welle relay. ID and report on Middle East. (McGuire, MD) **DW-Rwanda** relay 0413 on 9765, news of international inquiry on police terror in Italy. (Howard Moser, Lincolnshire, IL)

0355 UTC on 15470

CZECH REP: Radio Prague. Poetry from Michael Ajvas. (Mosler, IL) 11600 at 2245 with *Talking Point* on children's rights // 15545. (Fraser, MA)

1007 UTC on 15185

EQUATORIAL GUINEA: Radio Africa. Evangelical teachings from Hebrews. (Stewart/CAN/ODXA) 5002.5 at 1807 with ethnic music, S9 signal quality. (Liangas, GRC/HCDX)

1026 UTC on 9525

INDONESIA: Voice of Indonesia. Presumed political commentary of fair signal quality. Chinese service at 1030. (Stewart, CAN/ODXA) **VOI** noted 15150 at 2039. Music tune from Malay singer Siti Nuraliza to announcer's chat. Newscast to gamelan music. (Liangas, GRC/HCDX) **RRI-Ternate** 3344.7, 1955-2015. Indonesian service including station interval signal to identification. Qu'ran recitations to Indonesian music. SINPO 23432. (Duane Hadley, Bristol, TN)

1032 UTC on 6125

URUGUAY: SODRE. Uruguayan folk music to commercials of La Piedras, Montevideo and Santa Rosa. SINPO 34333. Uruguay's **Radio Montecarlo** 6140 at 1240. Program promo as, "aqui esta su disco" to commercials and time checks. (Slaen, ARG)

1132 UTC on 21670

SAUDI ARABIA: BSKSA. Indonesian service with program Acara Pacaran Islam, including references to Arab kings after 1140, 44444 signal, // 21740. (Liangas, GRC/HCDX)

1215 UTC on 5060

UZBEKISTAN: Radio Tashkent. Regional music to ten minutes of English news from announcer duo. Middle-eastern music to identification at 1230, "you are listening to Radio Tashkent from the Republic of Uzbekistan." Program pause to resumption in regional language. Station ID at 1231. Current affairs reporting with reference to Taliban. Reception via brief grayline propagation peak-

ing by 1240. (David Hodgson, TN/HCDX) Tentative logging on 5025, 1615 in regional languages. Signal not heard at 1634 recheck. (Liangas/GRC/HCDX)

1420 UTC on 9505

JAPAN: NHK/Radio Japan. News on sending humanitarian aid for refugees. (Afghanistan?) Signal fair but steady. (Moser, IL)

1445 UTC on 17720

CUBA: Radio China Int'l relay. Interview and chat with Tai Chi instructor. (Moser, IL)

1605 UTC on 15605

FRANCE: Radio France International. French lesson using the poems of Charles Gounaire. (Fraser, MA)

1645 UTC on 7245

TAJIKISTAN: Radio Tajikistan. English news into Tajik folk music. Good signal quality at S9+. (Liangas, GRC/HCDX)

1804 UTC on 4820

BOTSWANA: Radio Botswana. National newscast. Station observed at 1642 with news and reports to ID, "Radio Botswana from Gaborone." Pop music tunes with S7 signal quality. Signal fade by 1652, SINPO 33323. (Liangas, GRC/HCDX)

1935 UTC on 5765USB

GUAM: Armed Forces Network. Pop tunes including *Unchain My Heart*. Signal S5 with slight interference observed. (Liangas, GRC)

AFN Puerto Rico 6458.5 USB, 2346-000 with *Cross Fire* segment. (Frodge, MI) Additional AFN broadcast may be heard as; **Key West FL** 12689.5 USB, 12689.5 USB; **Signoella, Sicily** 4993 USB, 10940.5 USB; **Guam** 13362 USB; **Diego Garcia** 12579 USB, 4319 USB; **Hawaii** 10320 USB, 6350 USB. - ed.

1805 UTC on 11990

KUWAIT: Radio Kuwait. Discussion and comments relating to Iraq vs Kuwait. (Fraser, MA) Interesting pop music from the sub continent at 1655 on 15110, presumed Urdu service. Station ID at 1700. (Banks, TX)

2015 UTC on 9655

VATICAN STATE: Vatican Radio. Report on African refugee camps, // 11625. (Fraser, MA)

2045 UTC on 21590

NETHERLANDS ANTILLES: Radio Netherlands **Bonaire** relay. Several station IDs to program on food safety and quality. (David W. Weronka, Benson, NC; Wilden, IN)

2101 UTC on 11840

AUSTRALIA: Christian Voice Int'l. "CVI" identification at tune-in to religious music. "Good Morning Africa" from male host with IDs and program lineup in English/French. Signal best monitored in USB, // 9865 fair to poor. (Frodge, MI)

2109 UTC on 7410

INDIA: All India Radio. Newscast to 2110 into subcontinent music. Possible Hindi service at 2120 with commentary segment. (Frodge, MI) 11620 at 0205 with regional news. (McGuire, MD)

2124 UTC on 7935

CHINA: CPBS (Tent) Chinese talk to music at 2129, // 11740 with poor-fair quality. 7935 has been reported as CPBS1, 11740 as CPBS2. (Frodge, MI)

2203 UTC on 9736.2

PARAGUAY: Radio Nacional. (Tent.) Announcer's "happy talk" routine in Spanish, to commercial breaks that included Beatles and LaBamba music. No IDs noted, best to monitor in USB to avoid heterodyne. (Frodge, MI)

2207 UTC on 5985

CONGO: Radio Congo. (Tent.) Africa, US soul and Latin tunes. Spanish ID as, "esta es Radio Congo." French announcements at 2249 into Afro music. Abrupt sign-off at 2259 in mid music. (Frodge, MI)

2257 UTC on 4980

VENEZUELA: Ecos del Torbes. Commercials to station promos. *Musica Romanitica* program to 2346 ID. Fair signal quality. (Frodge, MI)

Thanks to our contributors – Have you sent in YOUR logs?

Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com)

English broadcast unless otherwise noted.

Clear Channel QSLing

A great introduction to the broadcast band is DXing and QSLing the clear channels. As the name implies, clear channel stations operate on channels that are relatively "clear" of interference despite being shared with other stations during daytime.

Clear channels are allowed 50,000 watts of power and have large coverage areas at night, extending over many states or Canadian provinces. By their prominent "power house" signals, beginners find these stations an excellent introduction to the broadcast band.

QSLing the clear channels is relatively easy. All are excellent verifiers and if you ask, most will send you extra goodies with the station logo such as stickers, key chains and even T-shirts. Return postage is always appreciated and enclosing a postcard is an added courtesy to the staff.

The following stations offer excellent opportunities to begin your Clear Channel QSLing.

USA

640	KFI
650	WSM, KENI, KHN
660	WFAN, KFAR
670	WMAQ, KDLG, KPUA
700	WLW
720	WGN, KOTZ, KDW
750	WSB, KFQD, KXL
760	WJR, KFMB, KGU
770	WABC, KKOB
780	WBBM, KKO
810	KGO, WGY
820	WBAP, KCBF
830	WCCO
840	WHAS
870	WWL
880	WCBS, KRVN
890	WLS
1020	KDKA, KTNQ, KCKN
1030	WBZ, KTWO
1040	WHO
1100	WTAM, KFAX
1120	KMOX, KPNW
1140	WRVA, KHTK
1160	KSL
1170	KVOO, WWVA
1180	WHAM, VOA
1200	WOAI
1210	WPHT



Mexico

540	XEWA
730	XEX
800	XEROK
900	XEW
940	XEQ
1050	XEG
1060	XEEP
1090	XEPRS
1140	XEMR
1190	XEWK
1220	XEB
1550	XERUV
1570	XERF

Canada

540	CBT, CBK
690	CBU, CIQC
740	CBX,
800	CKLW
860	CJBC
940	CKLV, CJIB
990	CBW, CBY, CKGM
1010	CBR, CFB
1070	CFAX, CBA
1130	CKWX
1580	CBJ

Bahamas

1540	ZNS-1
------	-------

AMATEUR RADIO

Hawaii Contest Station, NH7A, 20 Meters. Full data color antenna site card initialed by Al. Received in seven days for a SASE and N5FPW QSL card. QSL Manager address: Al Crespo, 3520 Keahi Place, Kihei, Hawaii 96753. (Larry Van Horn N5FPW, Brasstown, NC)

Morocco Contest Station, CN8WW, 20 & 15 Meters. Full data color antenna site card signed by DJ9MH. Received in one month via email request at station's website through the incoming bureau. Station website address: <http://www.dl6fbl.de/cn8ww>. (Van Horn NC)

St. Kitts-Nevis Contest Station, V47KP, 20, 15 & 10 Meters. Full data color operator's logo card signed by Alex Aimette K2SB. Received in seven days for an SASE and N5FPW QSL card. QSL Manager address: Alex (Doc) Aimette, P.O. Box 64-436, Souderton, PA 18964. (Van Horn, NC)

CZECH REPUBLIC

Radio Prague, 7345 kHz. Full data antique radio QSL card, signed with illegible initials. Received in 18 days for an English report. Station address: Vinohradská 12, 120 99 Prague, Czech Republic. Station website: <http://www.radio.cz>. (John Vercellino, Downers Grove, IL)

GREECE

The Voice of Greece, 17705 kHz. Full data card unsigned, plus stamps and program schedule. Received in 30 days for an English report. Station address: 432 Messoghion Av., 15342 Aghia Paraskevi, Athens, Greece. (Joe Squashic, Wake Forest, NC)

GUAM

KTWR, 15200 kHz. Full data QSL cards unsigned, depicting KTWR at sunset and photo of Pago Bay, plus handwritten note from Martha Hollis. Received in 180 days for an English report sent to former address of P.O. Box CC, Agat, Guam. KTWR mail department has transferred from Guam to Melbourne, Australia as; Trans World Radio Inc., P.O. Box 390, Box Hill, B.C. 3128, Victoria, Australia. (Lee Silvi, Mentor, OH)

JAPAN

Radio Japan, 11860 kHz. Full data Japanese scenery card unsigned, plus program schedule and station brochure. Received in 46 days for an English report and one IRC. Station address: NHK World, Nippon Hoso Kyokai, Tokyo 150-8001, Japan. (Frank Hilton, Charleston, SC)

Radio Tampa, 3925 kHz. Full data station logo card unsigned. Received in 25 days for an English report and mint postage (used

for reply). Station address: Nihon Shortwave Broadcasting, 9-15 Akasaka 1-chome, Minato-ku, Tokyo 107-8373, Japan. (Hilton, SC)

JORDAN

Radio Jordan, 11690 kHz. Full data card signed by Al Haitham Shibli Atoom-Director, plus schedule and station sticker. Received in 243 days for an English report and two U.S. dollars. Station address: P.O. Box 909, Amman, Jordan. (George Clement, Powder Springs, GA)

MEDIUM WAVE

KKYN, 1090 AM kHz. Full data verification letter and QSL card signed by Chief Engineer. Received in 38 days for an English AM report. Station address: 3218 Quincy St., Plainview, TX 79072. (Tom Banks, Dallas, TX)

KSWV 810 AM kHz. Friendly letter on station letterhead signed by George A. Gonzales-Owner & General Manager, plus station literature. Received in 16 days for an AM report. Station address: P.O. Box 1088, Santa Fe, NM 87501. (Patrick Martin, Seaside, OR)

KUAT, 1550 AM kHz. Verification letter signed by Lyle E. Kesterson-Radio Program Manager. Received in 16 days for an AM report. Station address: University of Arizona, Tucson, AZ 85721. (Martin, CA)

KVNA, 600 AM kHz. Verification letter signed by Dave Wilson-Program Director. Received in six days for AM report. Station address: 2690 E. Huntington Dr., Flagstaff, AZ 86004. (Martin, OR)

WSB, 750 AM kHz. Full data verification letter signed by Greg Moceri-Program Director, plus key chain, fridge magnets, stickers and coverage map. Received in seven days for an AM report and return postage. Station address: 1601 West Peachtree, N.E., Atlanta, GA 30309-2663. Ph: 404-897-7500. Website: <http://www.wsbradio.com/> (Gayle Van Horn, Brasstown, NC)

WGSR, 2570 AM kHz. Full data verification letter signed by D. Boekeloo-Chief Engineer, plus station brochure and studio photo. Received in 14 days for an AM report, SASE and a souvenir postcard. Station address: 707 Dade St., Fernandina Beach, FL 32034. (Banks, TX)

SPAIN

Radio Exterior España, 9680 kHz. Full data scenery postcard unsigned, plus frequency schedule. Received in 75 days for an English report and one IRC. Station address: Apartado de Correos 156.202, E-28080 Madrid, Spain.



John Figliozzi

jfiglio1@nycap.rr.com

“I Was Just Thinking...”

Deep thoughts about deep subjects, shallow thoughts about shallow subjects, deep thoughts about shallow subjects and shallow thoughts about deep subjects...

Some reports say that, in the aftermath of the terrorist attacks and subsequent military action in Afghanistan, sales of multi-band shortwave receivers are up as much as 500 percent. If you are one of these newcomers, please let me extend a warm welcome. As you page through this magazine, you will see that there are many different and interesting activities associated with this “hobby” of radio monitoring. By way of explanation, this is a monthly column that focuses on the *programming* of international shortwave broadcast stations and the myriad factors that influence it.

◆ One of “My Favorite Things”

(With apologies to Julie Andrews, but it does fit the holiday theme.) If someone were to ask me, my favorite station is probably **Radio Australia**. I say “probably” only because there a number of broadcasters I like a great deal – **Radio Netherlands**, **Radio Canada International**, **Radio Sweden**, **Radio Prague**, **Radio New Zealand International** – even the **BBC**! (Read on...). I don’t really believe there is a one best anything; but there are some aspects of RA that set it apart in my mind.

For one thing, RA remains a “full service, full time” broadcaster that maintains a prudent balance of news, information and entertainment programming. It’s done so in resourceful ways, even as it’s adjusted to consistently more pressing financial circumstances over the years. Today, **Radio Australia** relies on a mix of content; some it produces itself and some is produced by its sister domestic networks, primarily **ABC Radio National**. If the signature role of an international public broadcaster is to offer a panoramic view of its society to its listeners, no one does it better than RA. Just browse the station’s program titles in **MT’s Shortwave Guide**.

Where else can one hear such an accessible and interesting program about the cultural and social significance of design, architecture, landscapes and food as on *The Comfort Zone*? Learn about life in the outback

and other rural areas from *Rural Reporter* and *Bush Telegraph*. Hear what Australians are saying about the issues of the day on *Australia Talks Back*.

There are programs about health, the law, religion and spirituality, the media, sport, the arts, books and writing, history, politics, Australian society and family life, Aboriginal culture and issues. There are documentaries, educational series, interviews and an expansive array of music. The news of the day from an Aussie perspective is heard via the domestically produced news programs *AM*, *The World Today* and *PM*. As a self-professed “regional broadcaster,” Radio Australia’s flagship program *Asia Pacific* is unparalleled in its coverage of the Asian and Pacific regions, areas of the world usually left unexamined by others.

Unfortunately, **Radio Australia** is not always the easiest station to hear on shortwave in North America, especially as one moves east across the continent. Those persistent financial pressures forced RA to “officially” end its shortwave service to North America and Europe. Yet, it continues to advise listeners as to when frequencies for Asia and the Pacific are best heard in Europe and North America (9580 during local mornings is best) and has made the service available by alternative means – WRN (including *CBC Overnight* in Canada), satellite and the Internet <http://www.abc.net.au/ra>.

◆ A Preoccupation with the BBC?

One thing that newcomers will learn quickly is that many longtime listeners have developed a sort of “love-hate” relationship with the **BBC World Service**. The only way that I can explain this attitude is that the **World Service** has done so many things so well for such a long time that listeners have come to feel a sense of entitlement to or ownership over whatever they find to be of value to them. When it is perceived that the **BBC** is not meeting those high expectations, the response can be sharp, to say the least. In that regard...

As I write this, it’s November 12 and the **BBC World Service** has broken into its regular programming with news about yet another air disaster in New York City. It has stayed with the story for four hours now – too long – and, thereby, repeats the same mis-

take made by US-based news networks like CNN, MSNBC and Fox News. When new information about an event is steadily emerging, extra coverage is warranted. But when that coverage consists of the same information over and over, the urge for presenters to begin speculating about things seems to become overwhelming. As such, wall-to-wall coverage starts to become a disservice to its listeners.

We turn to the **BBC** for something different, something better than what we can get from our domestic sources. One of these is a greater sense of balance and proportion in reporting on events and issues. The **BBC** should remember that. It’s also interesting to note that, in contrast to the **BBC**, **VOA (Voice of America) News Now** – which is more directly designed as a rolling 24 hour global news service – chose to continue with its regular schedule of reports and features.

Parenthetically, this is one more indication that the **BBC World Service** has apparently decided to emphasize news and current events over its equally renown and pre-eminent feature programming. At one time, **BBC** schedulers took great pains to ensure that listeners could hear their favorite programs. Today, when the decision to go with extended news is taken, features are unceremoniously dropped with no effort taken to reschedule them.

◆ Abrupt Departures

15190 kHz, the **BBC World Service**’s omnibus morning frequency for the Americas (but not *really* for North America), just left the air at its appointed time in mid-sentence. It’s hard to think of anything that indicates a greater lack of respect for an audience more than this practice, which is increasingly endemic to international shortwave broadcasting in general. A little extra effort to coordinate transmitter shutdowns and programming breaks is all that is needed here, but there seems to be little interest in doing so. Thankfully, some stations like the **VOA** and **Radio Australia** still take the time to warn about frequencies that are closing and informing the listener where to retune to continue listening. (They do want us to keep listening, don’t they?! I always thought it was just polite to say good-bye when one is leaving...)

Happy New Year! I resolve to try to complain less in 2002. (I said *I’ll try...*)

HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twfha USA, Voice of America
 ① ② ⑤ ③ ④

5995am 6130ca 7405am 9455af
 ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑥, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑦ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, inter-

ference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

Gayle Van Horn Frequency Manager gayle@webworkz.com	John Figliozzi Program Manager jfiglio1@nycap.rr.com
---	--

Mark Fine, VA
mark.fine@fineware-sw.com

Program Highlights

John Figliozzi

Radio Australia's "Silly Season"

You might have noticed that **Radio Australia**'s program schedule has been a little scrambled the last few weeks. "Silly Season" is the term Aussies give to this time of year – when the holiday and summer vacation seasons intersect. It makes Australia an especially relaxed and festive place for several weeks. That spirit also invades **RA** and numerous programs go on hiatus. Don't worry. They'll be back by mid to late January.

What's Going On At HCJB?

HCJB-The Voice of the Andes has been shrinking right before our very ears. First, there was the gradual loss of several programs that made **HCJB** truly unique – shows like:

- *What's Cooking in the Andes*, a regional culinary program;
- *You Should Know*, a unique program on contemporary issues and ethics.
- *El Mundo Futuro*, the station's one-time very popular science program.

Now, since November, time devoted to staples like **DX Partyline**, **Ham Radio Today** and **Musica del Ecuador** has been sharply diminished with a significant reduction in overall broadcast time to North America.

At one time, you could point to **HCJB** and say that this was the way to do missionary radio. That time seems to be passing. **HCJB** today is sounding more and more like just another religious broadcaster.

Trends and Contradictions

All the indications are that shortwave receiver purchases in North America have increased almost exponentially since September 11 and already had been increasing at a double digit percentage pace for several years. Yet, North American listeners continue to experience a wavering in commitment on the part of several international shortwave broadcasters.

The broadcasters so inclined tell us they are moving to other delivery platforms where the listeners are. But more and more it looks like it's these broadcasters that are trying to drag listeners to the platforms *they* (the stations) would like to see them prefer.

VOR for West Coast mornings

The **Voice of Russia** has added some hours to North America, namely 1500-1900 UT for western North America on 7260 kHz. See this month's program listings for details.

0000 UTC - 7PM E / 6PM C / 4PM P

0000 0015	Cambodia, National Radio Of	11940as
0000 0015	Japan, Radio	13650as 17810as
0000 0030	Australia, Radio	9660pa 12080pa 15240as 15415as 17580va
0000 0030	Austria, Radio	17750as 17795va 21615as 21740va
0000 0030	Austria, Christian Voice	17750as 17850as
0000 0030	Egypt, Radio Cairo	9900na
0000 0030	Sri Lanka, SLBC	4940do
0000 0030	Thailand, Radio	9655af 9680af 11905af 5975am 6195as 7105as
0000 0030	UK, BBC World Service	3915as 5965as 12095sa 15280as 15310as
0000 0045	India, All India Radio	9705as 9950as 13605as
0000 0100	Anguilla, Caribbean Beacon	6090na
0000 0100	Australia, ABC/Alice Springs	4835do
0000 0100	Australia, ABC/Katherine	5025do
0000 0100	Australia, ABC/Tennant Creek	4910do
0000 0100	Bulgaria, Radio	7400na 9400na
0000 0100	Canada, CBC Northern Service	9625do
0000 0100	Canada, CFRX Toronto ON	6070do
0000 0100	Canada, CFVP Calgary AB	6030do
0000 0100	Canada, CHNX Halifax, NS	6130do
0000 0100	Canada, CKZN St John's NF	6160do
0000 0100	Canada, CKZU Vancouver BC	6160do
0000 0100	Canada, Radio Canada Intl	5960na 6175na 9590na 9750as
0000 0100	Costa Rica, R for Peace Intl	7455irr 15040va 21815usb
0000 0100	Costa Rica, University Network	5030am 6150am 7375am 9724sa
0000 0100	Ecuador, HCJB	11785as
0000 a/monthly	Finland, Scand Weekend Radio	5980va 11720va
0000 0100	Germany, Voice of Hope	6040as
0000 0100	Guyana, Voice of	3290do 5950do
0000 0100	Japan, Radio	6145na
0000 0100	Malaysia, Radio	7295do
0000 0100	Malaysia, RTM Kota Kinabalu	5980do
0000 0100	Malaysia, RTM Sarawak 7160do	
0000 0100	Namibia, NBC	3270af 3290af
0000 0100	Netherlands, Radio	6165na 9845na
0000 0100	New Zealand, Radio NZ Intl	17675pa
0000 0100	Papua New Guinea, NBC	9675do 11880irr
0000 0100	Russia, University Network	9940as
0000 0100	Singapore, SBC Radio One	6150do
0000 0100	Solomon Islands, SIBC	5020do 9545do
0000 0100	Spain, R Exterior Espana	6055na
0000 0100	USA, Armed Forces Radio	6458usb 12689usb
0000 0100	USA, KAIJ Dallas TX	5755va
0000 0100	USA, KTBW Salt Lk City UT	7510na
0000 0100	USA, KWHR Naalehu HI	17510as
0000 0100	USA, Voice of America	5995me 6130am 7405am 9455am 9775am
0000 0100	USA, WBCQ Monticello ME	7415na 9335na 17495na
0000 0100	USA, WEWN Birmingham AL	5825na 9355na 15745na
0000 0100	USA, WHRA Greenbush ME	7580af
0000 0100	USA, WHRI Noblesville IN	5745va 7315am
0000 0100	USA, WINB Red Lion PA	12160am
0000 0100	USA, WJCR Upton KY	7490am 13595as
0000 0100	USA, WRMI Miami FL	9955am
0000 0100	USA, WRNO New Orleans LA	7355am
0000 0100	USA, WSHB Cyp Creek SC	9430na 15285sa
0000 0100	USA, WTIC Newport NC	9370na
0000 0100	USA, WWBS Macon GA	11900na
0000 0100	USA, WWCR Nashville TN	3215na 5070na 7520na 13845na
0000 0100	USA, WWFV McCaysville GA	6890va 9320va 12172va
0000 0100	USA, WYFR Okeechobee FL	6085na 9505na
0000 0100	Vanuatu, Radio	3945do 4960do 7260do
0000 0100	Zambia, Christian Voice	4965do
0005 0010	Croatia, Croatian Radio	7285al 9925sa
0030 0010	Australia, Christian Voice	21680as
0030 0010	Australia, Christian Voice Intl	17775as 17850pa 15240as 15415as
0030 0010	Australia, Radio	9660pa 12080pa 15135as 15240as 15415as
0030 0010	Austria, Christian Voice	17775as 17850as 21680pa
0030 0100	Iran, VO Islamic Rep. of Iran	6065am 6135na
0030 0100	Lithuania, R Vilnius	7325am
0030 0100	Sri Lanka, SLBC	4940do 6005as 9770as 15425as
0030 0100	Thailand, Radio	9655as 11905as 13695as
0030 0100	UAE, AWR Africa	6025as 6055as
0030 0100	UK, BBC World Service	5965as 5975am 6195as 7105as 9410as
0030 0100	11955as 12095sa 15280as 15310as 15360as 17790as	
0030 0100	USA, VOA Special English	7215as 9890as 11760as 15185as
0030 0100	15290as 17740as 17820as	
0030 0100	USA, Voice of America	5995me 6015me 6105me 7215as 7265me
0030 0100	9890as 11760as 15185as 15290as 17740as 17820as	
0030 0100	USA, Voice of America	5995me 6015me 6105me 7215as 7265me
0055 0100	Italy, RAI Int'l 9675na	11800na

0100 UTC - 8PM E / 7PM C / 5PM P

0100 0115	Italy, RAI Int'l 9675na	11800na
0100 0125	Netherlands, Radio	6165na 9845na
0100 0127	Czech Rep, Radio Prague Intl	6200na 7345na

0100 0127	Iran, VO Islamic Rep. of Iran	6065am 6135na
0100 0130	Vietnam, Voice of	6175na
0100 0130	Australia, Christian Voice	17775as 21550pa 21680pa
0100 0130	Austria, AWR Europe	6160as
0100 0130	Austria, Christian Voice	17775as 21550as 21680pa
0100 0130	Germany, Universal Life	9435as
0100 0130	Germany, Voice of Hope	6040as
0100 0130	Slovakia, R Slovakia Intl	5930na
0100 0130	USA, Voice of America	5995am 13790am
0100 0130	Uzbekistan, Radio Tashkent	5955as 5975as 7105as 7215as
0100 0130	Yugoslavia, Radio	7115am
0100 0145	Germany, Deutsche Welle	6040na 6145am 9640na 9700am
0100 0200	17750as 17795va 21725as	
0100 0200	Canada, CBC Northern Service	9625do
0100 0200	Canada, CFRX Toronto ON	6070do
0100 0200	Canada, CFVP Calgary AB	6030do
0100 0200	Canada, CHNX Halifax, NS	6130do
0100 0200	Canada, CKZN St John's NF	6160do
0100 0200	Canada, CKZU Vancouver BC	6160do
0100 0200	China, China Radio Intl	9580na
0100 0200	Costa Rica, R for Peace Intl	7455irr 15040va 21815usb
0100 0200	Costa Rica, University Network	5030am 6150am 7375am 9724sa
0100 0200	11870am 13749na	
0100 0200	Cuba, Radio Havana	6000na 9820na 11705usb
0100 0200	Ecuador, HCJB	9745na 11840na 21455usb
0100 0200	Finland, Scand Weekend Radio	5980va 11720va
0100 0200	Guyana, Voice of	3290do 5950do
0100 0200	Indonesia, Voice of	9525pa 11785as 15150as
0100 0200	Japan, Radio	11860pa 11870as 11880va 17810as 15325as
0100 0200	Malaysia, Radio	7295do
0100 0200	Malaysia, RTM Kota Kinabalu	5980do 5980do
0100 0200	Namibia, NBC	3270af 3290af
0100 0200	New Zealand, Radio NZ Intl	17675pa 6195va
0100 0200	North Korea, VO Korea	6520va 7140va 7580va 9345as
0100 0200	11734va	
0100 0200	Papua New Guinea, NBC	9675do 11880irr
0100 0200	Russia, University Network	9940as
0100 0200	Singapore, SBC Radio One	6150do
0100 0200	Solomon Islands, SIBC	5020do 9545do
0100 0200	Spain, R Exterior Espana	6055na
0100 0200	Sri Lanka, SLBC	6005as 9770as 15425as
0100 0200	UK, BBC World Service	5965as 5975am 6195as 9410as 9525ca
0100 0200	9915sa 11955as 12095sa 15280as 15310as 15360as 17790as	
0100 0200	Ukraine, R Ukraine Intl	7375eu
0100 0200	USA, Armed Forces Radio	7420as 9610as
0100 0200	USA, KAIJ Dallas TX	5755va
0100 0200	USA, KTBW Salt Lk City UT	7510na
0100 0200	USA, KVOH Los Angeles CA	9975na
0100 0200	USA, KWHR Naalehu HI	17510as
0100 0200	USA, Voice of America	5995me 7255am 9850as 11705as 12689usb
0100 0200	17820as	
0100 0200	USA, WBCQ Monticello ME	7415na 9335na 17495na
0100 0200	USA, WEWN Birmingham AL	5825na 9355na 15745na
0100 0200	USA, WHRA Greenbush ME	7580af
0100 0200	USA, WHRI Noblesville IN	5745va 7315am
0100 0200	USA, WINB Red Lion PA	12160am
0100 0200	USA, WJCR Upton KY	7490am 13595as
0100 0200	USA, WRMI Miami FL	9955am
0100 0200	USA, WRNO New Orleans LA	7355am
0100 0200	USA, WSHB Cyp Creek SC	9430na 15285sa
0100 0200	USA, WTJC Newport NC	9370na
0100 0200	USA, WWCR Nashville TN	3215na 5070na 5935na 7520na
0100 0200	USA, WWFV McCaysville GA	6890va 9320va 12172va
0100 0200	USA, WYFR Okeechobee FL	6065na 9505na 15060as
0100 0200	Vanuatu, Radio	3945do 4960do 7260do
0100 0200	Zambia, Christian Voice	4965do
0130 0145	Libya, Voice of Africa	15435ir 17725af
0130 0200	Austria, Christian Voice	21550as 21680pa
0130 0200	Sweden, Radio	9495va
0130 0200	UK, RTE Radio	6155ca
0130 0200	USA, VOA Special English	7405am 9775am 13740am
0130 0200	USA, Voice of America	5995am 6130am 9455am
0140 0200	Vatican City, Vatican Radio	7335au 9650au

0200 UTC - 9PM E / 8PM C / 6PM P

0200 0227	Czech Rep, Radio Prague Intl	6200na 7345na
0200 0230	Germany, Voice of Hope	11785as
0200 0230	Hungary, Radio Budapest	9835na
0200 0230	Myanmar, Radio	7185do
0200 0230	Yugoslavia, Radio	7130am
0200 0245	Germany, Deutsche Welle	7285as 9615as 9765as 11965as
0200 0259	Canada, Radio Canada Intl	6040am 7235as 9755am 11725am
0200 0300	11990am 15150as 17860as	
0200 0300	Anguilla, Caribbean Beacon	6090am
0200 0300	Argentina, RAE	6060am 11710am

SELECTED PROGRAMMING BEGINS ON PAGE 55

Shortwave Guide

11

0200	0300	vl	Australia, ABC/Alice Springs	4835do		0300	0400	vl	Botswana, Radio	3356do	4820do	7255do	
0200	0300	vl	Australia, ABC/Katherine	5025do		0300	0400		Bulgaria, Radio	7400na	9400na		
0200	0300	vl	Australia, ABC/Tennant Creek	4910do		0300	0400		Canada, CBC Northern Service	9625do			
0200	0300		Australia, Christian Voice Intl	21550as	21680pa	0300	0400		Canada, CFRX Toronto ON	6070do			
0200	0300		Australia, Radio	9660pa	12080pa	15415as	15515va	17580va	Canada, CFVP Calgary AB	6030do			
				17750as	21725as				Canada, CHNX Halifax, NS	6130do			
0200	0300		Austria, Christian Voice	21550as	21680pa				Canada, CKZN St John's NF	6160do			
0200	0300		Canada, CBC Northern Service	9625do					Canada, CKZU Vancouver BC	6160do			
0200	0300		Canada, CFRX Toronto ON	6070do					China, China Radio Intl	9690na	9790na		
0200	0300		Canada, CFVP Calgary AB	6030do					Costa Rica, R for Peace Intl	7455irr	15040va		
0200	0300		Canada, CHNX Halifax, NS	6130do					Costa Rica, University Network	5030am	6150am	7375am	
0200	0300		Canada, CKZN St John's NF	6160do								9724sa	
0200	0300		Canada, CKZU Vancouver BC	6160do					11870am	13749na	17645as		
0200	0300		Costa Rica, R for Peace Intl	7455irr	15040va	21815usb			Cuba, Radio Havana	6000na	9820na	11705usb	
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9724sa		Ecuador, HCJB	9745na	11840na	21455usb	
0200	0300			11870am	13749na	13749na			Finland, Scandv Weekend Radio	5990va	11720va		
0200	0300		Cuba, Radio Havana	6000na	9820na	11705usb			Guatemala, Radio Cultural	3300do	5955do		
0200	0300		Ecuador, HCJB	9745na	11840na	21455usb			Guyana, Voice of	3290do	5950do		
0200	0300		Egypt, Radio Cairo	9475na					Japan, Radio	17825ca			
0200	0300	a/monthly	Finland, Scandv Weekend Radio	5990va	11720va				Kenya, Kenya BC Corp	4885ir	4915irr		
0200	0300		Guyana, Voice of	3290do	5950do				Lesotho, Radio	4800do			
0200	0300		Kenya, Kenya BC Corp	4885ir	4915irr				Malaysia, Radio	7295do			
0200	0300		Malaysia, Radio	7295do					Malaysia, Voice of	6175as	9750as	15295pa	
0200	0300		Malaysia, RTM Kota Kinabalu	5980do					Namibia, NBC	3270af	3290af	7215irr	
0200	0300		Namibia, NBC	3270af	3290af	7215irr			North Korea, VO Korea	6195va	7140va		
0200	0300		New Zealand, Radio NZ Intl	17675pa					Oman, Radio	15355va			
0200	0300		North Korea, VO Korea	9325va	11335va				Papua New Guinea, NBC	9675do	11880irr		
0200	0300	vl	Papua New Guinea, NBC	9675do	11880irr				Philippines, Radio Pilipinas	12015me	15120me	15270me	
0200	0300		Romania, R Romania Intl	9550na	11740na	11830na	11940va		Russia, University Network	17765as			
0200	0300		Russia, University Network	9940as					Russia, Voice of Russia	7180na	7250na	12020na	
0200	0300		Russia, Voice of Russia	7180na	7250na	9765na	12020na		Singapore, SBC Radio One	6150do			
0200	0300	vl	Singapore, SBC Radio One	6150do	9545do				Solomon Islands, SIBC	5020do			
0200	0300		Solomon Islands, SIBC	5020do	9545do				Sri Lanka, SLBC	6005as	9770as	15425as	
0200	0300		South Korea, R Korea Intl	15575na	15575na				Taiwan, R Taipei Intl	5950na	9680na	15320as	
0200	0300		Sri Lanka, SLBC	6005as	6130do	9770as	15425as		Uganda, Radio	5026do	7196do	11875as	
0200	0300		Taiwan, R Taipei Intl	5950na	9680na	11740ca	15320as		UK, BBC World Service	3255af	5975am	6005af	
0200	0300		UK, BBC World Service	5975am	9410me	9525ca	12035af		6190af	6190af	6195eu		
0200	0300			11955as	12095sa	15280as	15310as		15280as	15310as	15360as	21660as	
0200	0300			15280as	15310as	15360as	17790as		USA, Armed Forces Radio	15575am	17760as	17790as	
0200	0300		USA, Armed Forces Radio	6458usb	12689usb				USA, KAIJ Dallas TX	5755va			
0200	0300		USA, KAIJ Dallas TX	5755va					USA, KTBN Salt Lk City UT	57510na			
0200	0300		USA, KJES Vado NM	7555na					USA, KWHR Naalehu HI	17510as			
0200	0300		USA, KTBN Salt Lk City UT	7510na					USA, Voice of America	6035af	6080af	7290af	
0200	0300		USA, KVOH Los Angeles CA	9975na					7415af	9575af	9885af	7340af	
0200	0300		USA, KWHR Naalehu HI	17510as					USA, WBCQ Monticello ME	7415na	9335na		
0200	0300		USA, Voice of America	5995me	6015me	6105me	7115as		USA, WEWN Birmingham AL	5825na	7425na	15745na	
0200	0300		7255me	9850as	11705as	11820as	15250as		USA, WHRA Greenbush ME	7580af			
0200	0300		17820as				15300as	17740as		USA, WHRI Noblesville IN	5745va	7315am	
0200	0300		USA, WBCQ Monticello ME	7415na	9335na				USA, WINB, Red Lion PA	12160am			
0200	0300		USA, WEWN Birmingham AL	5825na	9355na	15745na			USA, WJCR Upton KY	7490am	13595as		
0200	0300		USA, WHRA Greenbush ME	7580af					USA, WMLK Bethel PA	9465eu			
0200	0300		USA, WHRI Noblesville IN	5745na	7315am				USA, WRMI Miami FL	7385am			
0200	0300		USA, WINB Red Lion PA	12160am					USA, WRNO New Orleans LA	7395am			
0200	0300		USA, WJCR Upton KY	7490am	13595as				USA, WSHB Cyp Creek SC	7535eu			
0200	0300		USA, WRMI Miami FL	7385am					USA, WTJC Newport NC	9370na			
0200	0300		USA, WRNO New Orleans LA	7355am					USA, WWCR Nashville TN	3215na	5070na	5935na	
0200	0300		USA, WSHB Cyp Creek SC	7535am	9430na				USA, WWFW McCaysville GA	6890va	12172va		
0200	0300		USA, WTJC Newport NC	9370na					USA, WYFR Okeechobee FL	6065na	9505na		
0200	0300		USA, WWCR Nashville TN	3215na	5070na	5935na	7520na		Vanuatu, Radio	3945do	4960do	7260do	
0200	0300		3215na	5070na	5935na	7520na			Zambia, Christian Voice	6065do			
0200	0300		USA, WWFW McCaysville GA	6890va	12172va				Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na				Vatican City, Vatican Radio	9660af			
0200	0300	vl	Vanuatu, Radio	3945do	4960do	7260do			Libya, Voice of Africa	15435ir	17725af		
0200	0300		Zambia, Christian Voice	4965do					UAE, Emirates Radio	12005na	13675na	15400na	
0200	1215		11940as						Vietnam, Voice of	6175na			
0205	0210		Croatia, Croatian Radio	9725na					Albania, Radio Tirana Intl	15435ir			
0215	0220		Nepal, Radio	3230as	5005as				Hungary, Radio Budapest	9835na			
0230	0257		Vietnam, Voice of	6175na					Myanmar, Radio	9730do			
0230	0300		Austria, Radio Austria Intl	7325na					Sweden, Radio	9495na			
0230	0300		Iraq, Radio Iraq Intl	7157irr	9887irr	11787irr			UAE, AWR Africa	11795as			
0230	0300		Philippines, Radio Pilipinas	12015me	15120me	15270me			Seychelles, FEBA Radio	11885af			
0230	0300		Slovakia, AWR	7235as					Tajikistan, Radio	7245as			
0230	0300		Sweden, Radio	9495na					New Zealand, Radio NZ Intl	15340pa			
0245	0300		Albania, Radio Tirana Intl	6110al	6115na	7160na							
0250	0300		Vatican City, Vatican Radio	7305am	9605am								

0300 UTC - 10PM E / 9PM C / 7PM P

0300	0310	Vatican City, Vatican Radio	7305am	9605am
0300	0330	sm w fa	Belarus, Radio Belarus Intl	5970eu
0300	0330		Egypt, Radio Cairo	9475na
0300	0330		S Africa, Channel Africa	9525af
0300	0330		Thailand, Radio	9655am
0300	0330	a	UK, Wales Radio Intl	9795na
0300	0330		USA, KJES Vado NM	7555na
0300	0330		USA, KVHO Los Angeles CA	9975na
0300	0330	mtwhf	USA, Voice of America	4960af
0300	0345		Germany, Deutsche Welle	6020na
			9765na	11985na
0300	0358		New Zealand, Radio NZ Intl	17675pa
0300	0400		Anguilla, Caribbean Beacon	6090am
0300	0400	vl	Australia, ABC/Alice Springs	4835do
0300	0400	vl	Australia, ABC/Katherine	5025do
0300	0400	vl	Australia, ABC/Tennant Creek	4910do
0300	0400		Australia, Christian Voice Intl	21550pa
0300	0400		Australia, Radio	9660pa
			17580va	17750as
			21725as	
0300	0400		Austria, Christian Voice	21550pa
			21680pa	

0400	0425	Belgium, RVI Flanders R Intl	11985na			
0400	0427	Czech Rep, Radio Prague Intl	7345na	7385na	9435na	
0400	0430	Austria, Christian Voice 21550as				
0400	0430	France Radio France Intl 11910af	11995af	13610af		
0400	0430 vl	Guatemala, Radio Cultural	3300da	5955do		
0400	0430 s twhfa	Mexico, Radio Mexico Intl	9705am	11770am		
0400	0430 vl	Nigeria, Radio/Kaduna	6090do			
0400	0430	S Africa, AWR Africa	9650af			
0400	0430	S Africa, Channel Africa	5955af			
0400	0430	Sri Lanka, SLBC	6005as	9770as	15425as	
0400	0445	Germany, Deutsche Welle		6015af	7195af	9565af
0400	0445	USA, WYFR Okeechobee FL		6065na	9505na	9985eu
0400	0450	Turkey, Voice of	6020na	7240va		
0400	0500	Anguilla, Caribbean Beacon		6090am		
0400	0500 vl	Australia, ABC/Alice Springs		4835do		
0400	0500 vl	Australia, ABC/Katherine		5025do		
0400	0500 vl	Australia, ABC/Tennant Creek		4910da		
0400	0500	Australia, Christian Voice Intl		21550as		
0400	0500	Australia, Radio	9660pa	12080pa	15240as	15415as
		17580va	17750as	21725as	21780as	15515va
0400	0500 vl	Botswana, Radio	3356do	4820do	7255do	
0400	0500 vl	Cameroon, RTV	4850do	6005da		

Shortwave Guide

M+

0400 0500	Canada, CBC Northern Service	9625do	0500 0600	Costa Rica, R for Peace Intl	7455irr	15040va
0400 0500	Canada, CFRX Toronto ON	6070da	0500 0600	Costa Rica, University Network	5030am	6150am
0400 0500	Canada, CFVP Calgary AB	6030do	0500 0600	11870am 13749na	17645as	7375am 9724sa
0400 0500	Canada, CHNX Halifax, NS	6130do	0500 0600	Cuba, Radio Havana	9550na	9820na 9830usb
0400 0500	Canada, CKZN St John's NF	6160do	0500 0600	Ecuador, HCJB	9745na	11840na 21455usb
0400 0500	Canada, CKZU Vancouver BC	6160do	0500 0600	Finland, Scandv Weekend Radio	5990va	11720va
0400 0500	China, China Radio Intl 9560na	9730na	0500 0600	Guyana, Voice of	3290do	5950do
0400 0500	Costa Rica, R for Peace Intl	7455irr	0500 0600	Japan, Radio	5975eu	6110na 7230eu 9835na 11715eu
0400 0500	Costa Rica, University Network	5030am	0500 0600	11760eu 15195as	17810as	21755pa 4915irr
0400 0500	11870am 13749na	17645as	0500 0600	Kenya, Kenya BC Corp	4885irr	
0400 0500	Cuba, Radio Havana	6000na	0500 0600	Kuwait, Radio	15110as	
0400 0500	Ecuador, HCJB	9745na	0500 0600	Lesotho, Radio	4800do	
0400 0500 a/monthly	Finland, Scandv Weekend Radio	5990na	0500 0600	Malaysia, Radio	7295do	
0400 0500	Guyana, Voice of	3290do	0500 0600	Malaysia, RTM Sarawak	7160do	
0400 0500	Kenya, Kenya BC Corp	4885irr	0500 0600	Malaysia, Voice of	6175as	9750as 15295pa
0400 0500 vl	Lesotho, Radio	4800do	0500 0600	Myanmar, Radio	9730do	
0400 0500	Malaysia, Radio	7295do	0500 0600	Namibia, NBC	3270af	3290af 7215irr
0400 0500	Malaysia, Voice of	6175as	0500 0600	New Zealand, Radio NZ Intl	15340pa	
0400 0500	Myanmar, Radio	9730do	0500 0600	Nigeria, Radio/Enugu	6025do	
0400 0500	Namibia, NBC	3270af	0500 0600	Nigeria, Radio/Ibadan	6050do	
0400 0500	New Zealand, Radio NZ Intl	15340pa	0500 0600	Nigeria, Radio/Kaduna	4770do	6090do 7275do 9570do
0400 0500 vl	Nigeria, Radio/Enugu	6025do	0500 0600	Nigeria, Radio/Lagos	3326do	4990do
0400 0500 vl	Papua New Guinea, NBC	9675do	0500 0600	Nigeria, Voice of	7255af	11770af 15120va
0400 0500	Romania, R Romania Intl	9550na	0500 0600	Papua New Guinea, NBC	9675do	11880irr
0400 0500	Russia, University Network	17765as	0500 0600	Russia, University Network	17765as	
0400 0500	Russia, Voice of Russia	7125na	0500 0600	Russia, Voice of Russia	7125na	7180na 7330na 12010na 12020na
0400 0500	13665am 15595na	17595na	0500 0600	Singapore, SBC Radio One	6150do	
0400 0500 vl	Singapore, SBC Radio One	6150do	0500 0600	Solomon Islands, SIBC	5020do	9545do
0400 0500	Solomon Islands, SIBC	5020do	0500 0600	Spain, R Exterior Espana	6055na	
0400 0500	Uganda, Radio	5026do	0500 0600	Swaziland, TWR	6035af	7205af 9500af
0400 0500	UK, BBC World Service	3255af	0500 0600	Uganda, Radio	5026do	
0400 0500	6195eu	7160af	0500 0600	UK, BBC World Service	6005af	6135ca 6190af 6195eu 7160af
0400 0500	15310as	15420af	0500 0600	9410eu	11760me	11765af 11940af 11955as 15280as 15310as
0400 0500	Ukraine, R Ukraine Intl	17760as	0500 0600	15360as	15420af	15575as
0400 0500	USA, Armed Forces Radio	7285as	0500 0600	1640na	17640na	17760as 17790as 17885af
0400 0500	USA, KALI Dallas TX	5755va	0500 0600	21660as		
0400 0500	USA, KTBN Salt Lk City UT	7510na	0500 0600	USA, Armed Forces Radio	6458usb	12689usb
0400 0500	USA, KWHR Naalehu HI	17780as	0500 0600	USA, KALI Dallas TX	5755va	
0400 0500	USA, Voice of America	6080af	0500 0600	USA, KTBN Salt Lk City UT	7510na	
0400 0500	9775af	9885af	0500 0600	USA, KWHR Naalehu HI	11780as	
0400 0500	15205as		0500 0600	USA, KWHR Naalehu HI	11565pa	
0400 0500	USA, WBCQ Monticello ME	7415na	0500 0600	USA, Voice of America	5970af	6035af 6080af 7170af 7295af
0400 0500	USA, WEWN Birmingham AL	5825na	0500 0600	9700af	11825eu	11835af
0400 0500	USA, WHRA Greenbush ME	7580af	0500 0600	13710af	15205as	
0400 0500	USA, WHRI Noblesville IN	5745va	0500 0600	USA, WBCQ Monticello ME	7415na	9335na
0400 0500	USA, WINB, Red Lion PA	12160am	0500 0600	USA, WEWN Birmingham AL	5825na	7425na 15745na
0400 0500	USA, WJCR Upton KY	7490am	0500 0600	USA, WHRA Greenbush ME	7580af	
0400 0500	USA, WMLK Bethel PA	9465eu	0500 0600	USA, WHRI Noblesville IN	5745va	7315am
0400 0500	USA, WRMI Miami FL	7385am	0500 0600	USA, WJCR Upton KY	7490am	
0400 0500	USA, WSHB Cyp Creek SC	7535eu	0500 0600	USA, WMLK Bethel PA	9465eu	
0400 0500	USA, WTJC Newport NC	9370na	0500 0600	USA, WRMI Miami FL	7385am	
0400 0500	USA, WWCR Nashville TN	3215na	0500 0600	USA, WRNO New Orleans LA	7395am	
0400 0500	USA, WWFV McCaysville GA	6890va	0500 0600	USA, WSHB Cyp Creek SC	7353eu	12020af
0400 0500	Zambia, Christian Voice	6065do	0500 0600	USA, WTJC Newport NC	9370na	
0400 0500 vl	Zimbabwe, Zimbabwe BC Corp	4828do	0500 0600	USA, WWCR Nashville TN	3215na	5070na 5935na 7560na
0405 0410	Croatia, Croatian Radio	7285al	0500 0600	USA, WWFV McCaysville GA	6890va	12172va
0427 0500 a	Liberia, Voice of Hope	12060af	0500 0600	USA, WYFR Okeechobee FL	5810eu	
0430 0457	Czech Rep, Radio Prague Intl	9865va	0500 0600	Vanuatu, Radio	3945do	4960do
0430 0500	Australia, Christian Voice	21680pa	0500 0600	Zambia, Christian Voice	6065do	
0430 0500	Austria, Christian Voice	21550as	0500 0600	Ghana, Ghana BC Corp	3366do	4915do
0430 0500	Italy, IRRS	3980al	0500 0600	UAE, Emirates Radio	15435au	17830au 21700au
0430 0500	Netherlands, Radio	6165na	0500 0600	Austria, Christian Voice	21550as	21680pa
0430 0500 vl	Nigeria, Radio/Ibadan	6050do	0500 0600	S Africa, AWR Africa	15345af	
0430 0500 vl	Nigeria, Radio/Kaduna	4770do	0500 0600	Thailand, Radio	9655eu	11905eu
0430 0500 vl	Nigeria, Radio/Lagos	3326do	0500 0600	UK, BBC World Service	17885af	13780eu
0430 0500	S Africa, AWR Africa	12080af	0500 0600	Zimbabwe, Zimbabwe BC Corp	5975do	6045do
0430 0500 mtwhf	Swaziland, TWR	4775af	0500 0600			
0445 0500	Italy, RAI Intl 5965af	7235af	0500 0600			

0500 UTC - 12AM E / 11PM C / 9PM P

0500 0515	Canada, CBC Northern Service	9625do
0500 0515	Israel, Kol Israel	9435va
0500 0515	Zambia, National BC Corp	6265do
0500 0525 a	Liberia, Voice of Hope	12060af
0500 0530	Austria, Christian Voice	21550as
0500 0530	France Radio France Intl 13610af	15155af
0500 0530 s twhf	Mexico, Radio Mexico Intl	9705am
0500 0530	Netherlands, Radio	6165na
0500 0530	S Africa, AWR Africa	5960af
0500 0530	S Africa, Channel Africa	15215af
0500 0530	Vatican City, Vatican Radio	9660af
0500 0530 vl	Zimbabwe, Zimbabwe BC Corp	4828do
0500 0545	Germany, Deutsche Welle	5960na
0500 0600	Anguilla, Caribbean Beacon	6090am
0500 0600	Australia, ABC/Alice Springs	4835do
0500 0600	Australia, ABC/Katherine	5025do
0500 0600	Australia, ABC/Tennant Creek	4910do
0500 0600	Australia, Christian Voice	21550as
0500 0600	Australia, Radio	9660pa
0500 0600	17580va	17750as
0500 0600 mtwhf	Bhutan, Bhutan BC Service	5030al
0500 0600 vl	Botswana, Radio	3356do
0500 0600 vl	Cameroon, RTV	4850do
0500 0600	Canada, CFRX Toronto ON	6070do
0500 0600	Canada, CFVP Calgary AB	6030do
0500 0600	Canada, CHNX Halifax, NS	6130do
0500 0600	Canada, CKZN St John's NF	6160do
0500 0600	Canada, CKZU Vancouver BC	6160do

0600 0620	Vatican City, Vatican Radio	4005eu	5885eu	7250eu
0600 0630	France Radio France Intl 11710af	15155af	17800af	21620af
0600 0630	S Africa, AWR Africa	15345af		
0600 0630	S Africa, Channel Africa	15215af		
0600 0630	S Africa, TWR 15345af			
0600 0645	USA, Voice of America	5970af	6035af	6080af
0600 0700	Germany, Deutsche Welle	6140eu	7225af	9565af
0600 0700	Anguilla, Caribbean Beacon	6090am		
0600 0700	Australia, ABC/Alice Springs	4835do		
0600 0700	Australia, ABC/Katherine	5025do		
0600 0700	Australia, ABC/Tennant Creek	4910do		
0600 0700	Australia, Christian Voice	21550as	21680pa	
0600 0700	Australia, Radio	9660pa	12080pa	15240as
0600 0700	17580va	17750as	21725as	
0600 0700	Austria, Christian Voice	21550as	21680pa	
0600 0700	Botswana, Radio	7255do	9600do	
0600 0700	Cameroon, RTV	4850do	6005do	
0600 0700	Canada, CFRX Toronto ON	6070do		
0600 0700	Canada, CFVP Calgary AB	6030do		
0600 0700	Canada, CHNX Halifax, NS	6130do		
0600 0700	Canada, CKZN St John's NF	6160do		
0600 0700	Canada, CKZU Vancouver BC	6160do		
0600 0700	Costa Rica, R for Peace Intl	7455irr	15040va	
0600 0700	11870am 13749na	17645as	5030am	6150am
0600 0700	Cuba, Radio Havana	9550na	9820na	9830usb
0600 0700 a/monthly	Finland, Scandv Weekend Radio	5990va	11720va	
0600 0700	Ghana, Ghana BC Corp	3366do	4915do	

Shortwave Guide

M

0600 0700	Guyana, Voice of Italy, IRRS	3980al	3290do	5950do		0700 0800	as/vl	Eqt. Guinea, Radio East Africa	15185af
0600 0700	mtwhf/vl		3985va			0700 0800	a/monthly	Finland, Scandy Weekend Radio	5990va
0600 0700			7230eu	9835na	11740as 15195as 17870pa	0700 0800		France Radio France Intl	15605af
			21755pa			0700 0800		Germany, Voice of Hope	5975eu
0600 0700	Kenya, Kenya BC Corp	4885irr	4915irr			0700 0800		Germany, Deutsche Welle	6140eu
0600 0700	Kuwait, Radio	15110as				0700 0800	vl	Ghana, Ghana BC Corp	3366do 4915do
0600 0700	Lesotho, Radio	4800do				0700 0800		Guyana, Voice of	3290do
0600 0700	Liberia, ELWA	4760do				0700 0800	as/vl	Italy, IRRS	7120va
0600 0700	Liberia, R Liberia Intl	6100do				0700 0800	vl	Kuwait, Radio	15110as
0600 0700	Malaysia, Radio	7295do				0700 0800		Lesotho, Radio	4800do
0600 0700	Malaysia, RTM Sarawak	7160do				0700 0800		Liberia, ELWA	4760do
0600 0700	Malaysia, Voice of	6175as	9750as	15295pa		0700 0800		Liberia, R Liberia Intl	6100do
0600 0700	Myanmar, Radio	9730do				0700 0800		Malaysia, Radio	7295do
0600 0700	Namibia, NBC	3270af	3290af	7215irr		0700 0800		Malaysia, RTM Sarawak	7160do
0600 0700	New Zealand, Radio NZ Intl	15340pa				0700 0800		Malaysia, Voice of	6175as
0600 0700	Nigeria, Radio/Enugu	6025do				0700 0800		Myanmar, Radio	9730do
0600 0700	Nigeria, Radio/Ibadan	6050do				0700 0800		Namibia, NBC	3270af
0600 0700	Nigeria, Radio/Kaduna	4770do	6090do	7275do 9570do		0700 0800	vl	Nigeria, Radio/Enugu	6025do
0600 0700	Nigeria, Radio/Lagos	3326do	4990do			0700 0800		Nigeria, Radio/Ibadan	6050do
0600 0700	Nigeria, Voice of	7255af	11770af	15120va		0700 0800	vl	Nigeria, Radio/Kaduna	4770do
0600 0700	Papua New Guinea, NBC	9675do	11880irr			0700 0800	vl	Nigeria, Radio/Lagos	3326do
0600 0700	Romania, R Romania Intl	9530na	11830na			0700 0800	vl	Nigeria, Voice of	7255af
0600 0700	Russia, University Network	17765as				0700 0800		Romania, R Romania Intl	11770af
0600 0700	Russia, Voice of Russia	15470au	17655au	21790au		0700 0800		Russia, University Network	15120va
0600 0700	Sierra Leone, SLBS	3316do				0700 0800		Russia, Voice of Russia	15335af
0600 0700	Singapore, SBC Radio One	6150do				0700 0800		Russia, Voice of Russia	17765as
0600 0700	Solomon Islands, SIBC	5020do	9545do			0700 0800		Singapore, SBC Radio One	15275au
0600 0700	Swaziland, TWR	6035af	7205af	9500af		0700 0800		Solomon Islands, SIBC	3316do
0600 0700	Uganda, Radio	7110		7196do		0700 0800	vl	Swaziland, TWR	6035af
0600 0700	UK, BBC World Service	6054af	6190af	6195eu 7160af 9410eu		0700 0800		Taiwan, R Taipei Intl	5950na
		11760au	11765af	11955as	12095eu 15310as 15360as	0700 0800		Uganda, Radio	5026do
		15575as	17640af	17760as	17790as 21660as	0700 0800		UK, BBC World Service	6190af
0600 0700	UK, BBC World Service	17885af				0700 0800		UK, BBC World Service	11760me
0600 0700	USA, Armed Forces Radio	6458usb	12689usb			0700 0800	as	11955as	12095eu
0600 0700	USA, KAU Dallas TX	5755va				0700 0800		15310as	15400af
0600 0700	USA, KTBN Salt Lk City UT	7510na				0700 0800		17790as	17830af
0600 0700	USA, KWHR Naalehu HI	17780as				0700 0800		21660as	
0600 0700	USA, KWHR Naalehu HI	11565pa				0700 0800			
0600 0700	USA, WBCQ Monticello ME	7415na	9335na			0700 0800			
0600 0700	USA, WEWN Birmingham AL	5825na	7425na	15745na		0700 0800			
0600 0700	USA, WHRA Greenbush ME	7580af				0700 0800			
0600 0700	USA, WHRI Noblesville IN	5745va	7315am			0700 0800			
0600 0700	USA, WJCR Upton KY	7490am	13595as			0700 0800			
0600 0700	USA, WMKL Bethel PA	9465eu				0700 0800			
0600 0700	USA, WRMI Miami FL	7385am				0700 0800			
0600 0700	USA, WRNO New Orleans LA	7395am				0700 0800			
0600 0700	USA, WSHB Cyp Creek SC	7435af				0700 0800			
0600 0700	USA, WTJC Newport NC	9370na				0700 0800			
0600 0700	USA, WWCR Nashville TN	3215na	5070na	5935na 7560na		0700 0800			
0600 0700	USA, WWFV McCaysville GA	6980va	12172va			0700 0800	vl		
0600 0700	USA, WYFR Okeechobee FL	7355eu	11550eu			0700 0800			
0600 0700	Vanuatu, Radio	3945do	4960do	7260do		0700 0800	vl		
0600 0700	Yemen, Rep of Yemen Radio	9780me				0705 0800			
0600 0700	Zambia, Christian Voice	9865do				0706 0800			
0600 0700	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			0710 0715	mtwhf		
0605 0610	Croatia, Croatian Radio	9470au				0715 0800			
0610 0620	mtwhf	9420eu	11900au	15630eu 17520pa 21530eu		0720 0735	mtwhf		
0630 0700	Georgia, Georgian Radio	11805eu				0730 0758			
0630 0700	USA, Voice of America	5995af	7170af	11815eu 11915me 11930af		0730 0800	t h		
0630 0700	12025af	15205as	15335me			0730 0800	vl		
0630 0700	USA, Voice of America	5970af	6035af	6080af 7295af 11835af		0730 0800			
0630 0700	Vatican City, Vatican Radio	11625af	13765af	15570af		0745 0755	as		
0632 0700	Austria, Radio Austria Intl	6155eu	13730eu	17870me		0745 0755	as		
0636 0653	Romania, R Romania Intl	7145eu	9510eu	9570eu 11790eu		0745 0755	as		
		11940eu				0745 0800	mtwhf		

0700 UTC - 2AM E / 1AM C / 11PM P

0700 0705	New Zealand, Radio NZ Intl	15340pa				0800 0804		Pakistan, Radio	17510eu
0700 0705	USA, WWCR Nashville TN	5070na	5935na	7560na		0800 0815		Guam, KTWR/TWR	15200as
0700 0705	USA, WWCR Nashville TN	3210na				0800 0825		Belgium, RVI Flanders R Intl	5985eu
0700 0705	USA, WWCR Nashville TN	3215na				0800 0825		Malaysia, Voice of	6175as
0700 0730	Papua New Guinea, NBC	9675do	11880irr			0800 0827		Czech Rep, Radio Prague Intl	11600eu
0700 0730	Slovakia, R Slovakia Intl	15460au	17550au	21705au		0800 0830	vl	Australia, ABC/Alice Springs	4835do
0700 0730	USA, Voice of America	11915me	12025af	15335me		0800 0830	vl	Australia, ABC/Katherine	5025do
0700 0730	USA, Voice of America	6873af				0800 0830	vl	Australia, ABC/Tennant Creek	4910do
0700 0745	USA, WYFR Okeechobee FL	7355eu	9985af	11580af		0800 0900		Myanmar, Radio	9730do
0700 0800	Anguilla, Caribbean Beacon	6090am				0800 0900		Sierra Leone, SLBS	3316do
0700 0800	Australia, ABC/Alice Springs	4835do				0800 0900		USA, Voice of America	11995as
0700 0800	Australia, ABC/Katherine	5025do				0800 0900		Albania, TWR	12070eu
0700 0800	Australia, ABC/Tennant Creek	4910do				0800 0900		Anguilla, Caribbean Beacon	6090am
0700 0800	Australia, Christian Voice Intl	17820as	21680pa	21680pa		0800 0900		Australia, TWR	12070eu
0700 0800	Australia, Radio	9660pa	12080pa	15240va	15415as 17750as	0800 0900		Australia, Christian Voice	17820as
		17750as	21725as			0800 0900		Guam, KTWR/TWR	15200as
0700 0800	Austria, Christian Voice	17820as	21680pa			0800 0900		Bhutan, Bhutan BC Service	5030al
0700 0800	Botswana, Radio	7255do	9600do			0800 0900		Botswana, Radio	7255do
0700 0800	Cameroon, RTV	4850do	6005do			0800 0900		Cameroon, RTV	4850do
0700 0800	Canada, CFRX Toronto ON		6070da			0800 0900		Canada, CFRX Toronto ON	6070da
0700 0800	Canada, CFVP Calgary AB		6030da			0800 0900		Canada, CFVP Calgary AB	6030da
0700 0800	Canada, CHNX Halifax, NS		6130da			0800 0900		Canada, CHNX Halifax, NS	6130da
0700 0800	Canada, CKZN St John's NF		6160da			0800 0900		Canada, CKZN St John's NF	6160da
0700 0800	Canada, CKZU Vancouver BC		6160da			0800 0900		Canada, CKZU Vancouver BC	6160da
0700 0800	Costa Rica, R for Peace Intl		7455irr	15040va					
0700 0800	Costa Rica, University Network	5030am	6150am	7375am 9724sa					
		11870am	13749na	17645as					
0700 0800	Ecuador, HCJB	9780eu	11755pa	21455usb					
0700 0800	Eqt Guinea, Radio Africa	15185af							

0800 UTC - 3AM E / 2AM C / 12AM P

0800 0804	Pakistan, Radio	17510eu	21465eu
0800 0815	Guam, KTWR/TWR	15200as	
0800 0825	Belgium, RVI Flanders R Intl	5985eu	
0800 0825	Malaysia, Voice of	6175as	15295pa
0800 0827	Czech Rep, Radio Prague Intl	11600eu	15255eu
0800 0830	Australia, ABC/Alice Springs	4835do	
0800 0830	Australia, ABC/Katherine	5025do	
0800 0830	Australia, ABC/Tennant Creek	4910do	
0800 0830	Myanmar, Radio	9730do	
0800 0830	Sierra Leone, SLBS	3316do	
0800 0830	USA, Voice of America	11995as	13615as 15150as
0800 0900	Albania, TWR	12070eu	
0800 0900	Anguilla, Caribbean Beacon	6090am	
0800 0900	Australia, Christian Voice	17820as	21680pa
0800 0900	Australia, Radio	5995pa	9580va 9710as 12080pa 13605va
0800 0900	Guam, KTWR/TWR	15200as	
0800 0900	Bhutan, Bhutan BC Service	5030al	6035do
0800 0900	Botswana, Radio	7255do	
0800 0900	Cameroon, RTV	4850do	6005do
0800 0900	Canada, CFRX Toronto ON	6070da	
0800 0900	Canada, CFVP Calgary AB	6030da	
0800 0900	Canada, CHNX Halifax, NS	6130da	
0800 0900	Canada, CKZN St John's NF	6160da	
0800 0900	Canada, CKZU Vancouver BC	6160da	
0800 0900	Eqt. Guinea, Radio Africa	15185af	

Shortwave Guide

M_T

0800 0900	Costa Rica, R for Peace Intl	7455ir	15040va		0900 1000	mtwhf	Eqt Guinea, Radio Africa	15185af
0800 0900	Costa Rica, University Network	5030am	6150am	7375am 9724sa	0900 1000	as/vl	Eqt. Guinea, Radio East Africa	15185af
	11870am 13749na 17645as				0900 1000	a/monthly	Finland, Scand Weekend Radio	6170va 11720va
0800 0900	Ecuador, HCJB	9780eu	11755pa	21455usb	0900 1000		Germany, Deutsche Welle	6140eu
0800 0900	mtwhf				0900 1000		Germany, Voice of Hope 21590me	
0800 0900	Eqt Guinea, Radio Africa	15185af			0900 1000		Guyana, Voice of	3290do 5950do
0800 0900	Eqt. Guinea, Radio East Africa	15185pa			0900 1000	as/vl	Italy, IRRS 7120va 7125al	4915irr
0800 0900	a/monthly				0900 1000		Kenya, Kenya BC Corp	4885irr
0800 0900	Finland, Scand Weekend Radio	6170va	11720va		0900 1000	vl	Lesotho, Radio	4800do
0800 0900	Germany, Deutsche Welle	6140eu			0900 1000		Liberia, ELWA	4760do
0800 0900	Germany, Voice of Hope 5975eu	21590me			0900 1000		Liberia, R Liberia Intl	6100do
0800 0900	vl				0900 1000		Malaysia, Radio	7295do
0800 0900	Ghana, Ghana BC Corp	3366do	4915do		0900 1000	s	Malta, VO Mediterranean	9840eu
0800 0900	Guyana, Voice of	3290do	5950do		0900 1000		Namibia, NBC	7165af 7215af
0800 0900	Indonesia, Voice of	9525pa	11785as	15150as	0900 1000		New Zealand, Radio NZ Intl	11675pa
0800 0900	Italy, IRRS 7120va	7125al			0900 1000	vl	Nigeria, Radio/Enugu	6025do
0800 0900	Kenya, Kenya BC Corp	4885irr	4915irr		0900 1000		Nigeria, Radio/Ibadan	6050do
0800 0900	Lesotho, Radio	4800do			0900 1000	vl	Nigeria, Radio/Kaduna	4770do
0800 0900	Liberia, ELWA	4760do			0900 1000		Nigeria, Radio/Lagos	3326do
0800 0900	Liberia, R Liberia Intl	6100do			0900 1000	vl	Nigeria, Voice of	7255af 11770af
0800 0900	Malaysia, Radio	7295do			0900 1000		Palau, KHBN/VO Hope 15725as	
0800 0900	Monaco, TWR	9870eu			0900 1000	vl	Papua New Guinea, NBC	4890do 9675irr
0800 0900	Namibia, NBC	7165af	7215af		0900 1000		Russia, University Network	17765as
0800 0900	New Zealand, Radio NZ Intl	11675pa			0900 1000		Russia, Voice of Russia	15275au
0800 0900	Nigeria, Radio/Enugu	6025do			0900 1000	vl	Singapore, SBC Radio One	15470au 17495au 17525au
0800 0900	Nigeria, Radio/Ibadan	6050do			0900 1000		Solomon Islands, SIBC 5020do	6150do
0800 0900	Nigeria, Radio/Kaduna	4770do	6090do	7275do 9570do	0900 1000	vl	UK, BBC World Service	6190af 6195as 9605as 9740as 11760me
0800 0900	Nigeria, Radio/Lagos	3326do	4990do		0900 1000		11940af 11945as 12095eu 15190sa 15310as 15360as 15400af	
0800 0900	Nigeria, Voice of	7255af	11770af	15120va	0900 1000	vl	15485eu 15565eu 15575as 17885af 21470af	17880as
0800 0900	Papua New Guinea, NBC	4890do	9675irr		0900 1000		21660as	
0800 0900	Russia, University Network	17765as			0900 1000		USA, Armed Forces Radio	6458usb 12689usb
0800 0900	Russia, Voice of Russia	15275au	15470au	17495au 17525au	0900 1000		USA, KAJ Dallas TX	5755va
0800 0900	Singapore, SBC Radio One	6150do			0900 1000		USA, KTBN Salt Lk City UT	7510na
0800 0900	Solomon Islands, SIBC 5020do				0900 1000		USA, KWHR Nadeahu HI 9930as	11565pa
0800 0900	South Korea, R Korea Intl	9570om	13670eu		0900 1000		USA, Voice of America	11995as 13615as 15150as 15165me 15235me
0800 0900	UK, BBC World Service	6190af	9410eu	11940af 11955as 12095eu	0900 1000		17875af	
0800 0900	UK, BBC World Service	15310as	15360as	15485eu 15565eu 17640eu 17760as	0900 1000		USA, WBCQ Monticello ME	7415na
0800 0900	UK, BBC World Service	17830af	17885af	21470af 21660as	0900 1000		USA, WEWN Birmingham AL	5825na 7510na
0800 0900	USA, Armed Forces Radio	6458usb	12689usb		0900 1000		USA, WHRA Greenbush ME	7580af 7545va 7315am
0800 0900	USA, KAJ Dallas TX	5755va			0900 1000		USA, WJCR Upton KY	7490am 13595as
0800 0900	USA, KNLS Anchor Point AK	11765as			0900 1000		USA, WRMI Miami FL	7385am
0800 0900	USA, KTNB Salt Lk City UT	7510na			0900 1000		USA, WSHB Cyp Creek SC	7535eu 9455sa
0800 0900	USA, KWHR Nadeahu HI 9930as	11565pa			0900 1000		USA, WTJC Newport NC 9370na	9370na
0800 0900	USA, WBCQ Monticello ME	7415na			0900 1000		USA, WWCR Nashville TN	3210na 5070na 5935na 7560na
0800 0900	USA, WEWN Birmingham AL	5825na	7425na	15745na	0900 1000		Vanuatu, Radio	3945do 4960do 7260do
0800 0900	USA, WHRI Noblesville IN	5745va	7315am		0900 1000		Zambia, Christian Voice 9865do	
0800 0900	USA, WJCR Upton KY	7490am	13595as		0900 1000		Zimbabwe, Zimbabwe BC Corp	5975do 6045do
0800 0900	USA, WMLK Bethel PA	9465eu			0915 1000	vl	Ghana, Ghana BC Corp	6130do 4915do
0800 0900	USA, WRMI Miami FL	7385am			0915 1000	vl/as	Ghana, Ghana BC Corp	4915do
0800 0900	USA, WRNO New Orleans LA	7395am			0930 1000		Georgia, Georgian Radio	11910me
0800 0900	USA, WSHB Cyp Creek SC	7535eu	9845au		0930 1000		Greece, Voice of	9420eu 15630va
0800 0900	USA, WTJC Newport NC 9370na				0930 1000		Lithuania, R Vilnius	9710eu
0800 0900	USA, WWCR Nashville TN	3210na	5070na	5935na 7560na	0930 1000		Netherlands, Radio	7260va 9790va 12065va
0800 0900	Vanuatu, Radio	3945do	4960do	7260do				
0800 0900	Zambia, Christian Voice 9865do							
0800 0900	Zimbabwe, Zimbabwe BC Corp	5975do	6045do					
0805 0810	Croatia, Croatian Radio 13820au							
0815 0900	Guam, KTVR/TWR	15200as	15330as					
0830 0845 f	Seychelles, FEBA Radio	15460as						
0830 0900	Australia, ABC/Alice Springs	2310do						
0830 0900	Australia, ABC/Katherine	2485do						
0830 0900	Australia, ABC/Tennant Creek	2325do						
0830 0900	Austria, AWR Europe	9660eu	17820af					
0830 0900	Georgia, Georgian Radio	11910eu						
0830 0900	Italy, AWR Europe	9765eu						
0830 0900	Switzerland, Swiss R Intl 21770af							
0830 0900	USA, Voice of America	11995as	13615as	15150as 15165me 15235me 17875af				

0900 UTC - 4AM E / 3AM C / 1AM P

0900 0915	vl	Ghana, Ghana BC Corp	3366do	4915do	1000 1005		New Zealand, Radio NZ Intl	11675pa
0900 0920	mtwhf	Albania, TWR	12070eu		1000 1027		Czech Rep, Radio Prague Intl	21745va
0900 0920		Armenia, TWR	12070eu		1000 1027		Vietnam, Voice of	9840au 12019au
0900 0920	mtwhf	Monaco, TWR	9870eu		1000 1030		Guam, KSDA/AWR	11705as 11900as
0900 0930	s	Armenia, Voice of	4810eu	15270eu	1000 1030		Palau, KHBN/VO Hope	15725as
0900 0930		Austria, AWR Europe	17820af		1000 1030		UK, RTE Radio	11685au 15540au
0900 0930		Guam, KTVR/TWR	15330as		1000 1045		USA, KWHR Nadeahu HI 9930as	11565pa
0900 0945		Germany, Deutsche Welle	6160pa	7300as 11785af 15410af	1000 1056		North Korea, VO Korea	9335va 9850va 11710va 11735va
0900 1000		17800af 17820pa 17845pa	17860af	21560af	1000 1100		Anguilla, Caribbean Beacon	6090am
0900 1000		Anguilla, Caribbean Beacon	6090am		1000 1100		Australia, ABC/Alice Springs	2310do
0900 1000	vl	Australia, ABC/Alice Springs	2310do		1000 1100		Australia, ABC/Katherine	2485do
0900 1000	vl	Australia, ABC/Katherine	2485do		1000 1100		Australia, ABC/Tennant Creek	2325do
0900 1000		Australia, ABC/Tennant Creek	2325do		1000 1100		Australia, Christian Voice Intl	12775pa 17655pa 17725pa
0900 1000		Australia, Christian Voice Intl	13775pa	17725pa	1000 1100		Australia, Radio	6020pa 9580va 9710as 12080pa
0900 1000		12080pa 13605va 15400as	17750as	21820va	1000 1100		13605pa 15400as 17750va	21820va
0900 1000		Austria, Christian Voice	13775as	17725as	1000 1100		Austria, Christian Voice	13775as 17655as 17725as
0900 1000	vl	Botswana, Radio	7255do	9600do	1000 1100		Bhutan, Bhutan BC Service	5030al 6035do
0900 1000	vl	Cameroon, RTV	4850do	6005do	1000 1100		Botswana, Radio	7255do 9600do
0900 1000		Canada, CFRX Toronto ON	6070do		1000 1100		Canada, CFRX Toronto ON	6070do
0900 1000		Canada, CFVP Calgary AB	6030do		1000 1100		Canada, CHNX Halifax, NS	6130do
0900 1000		Canada, CHXN Halifax, NS	6130do		1000 1100		Canada, CKZN St John's NF	6160do
0900 1000		Canada, CKZN St John's NF	6160do		1000 1100		Canada, CKZU Vancouver BC	6160do
0900 1000		Canada, CKZU Vancouver BC	6160do		1000 1100		Costa Rica, R for Peace Intl	7455ir 15040va
0900 1000		China, China Radio Intl 11730pa	15210pa		1000 1100		Costa Rica, University Network	5030am 6150am 7375am 9724sa
0900 1000		Costa Rica, R for Peace Intl	7455ir	15040va	1000 1100		11870am 13749na 17645as	17645as
0900 1000		Costa Rica, University Network	5030am	6150am	1000 1100		Ecuador, HCJB	11775pa
0900 1000		11870am 13749na 17645as			1000 1100		17455usb	
0900 1000		Ecuador, HCJB	11775pa	21455usb	1000 1100		Egypt Guinea, Radio Africa	15185af

Shortwave Guide

11

1100 UTC - 6AM E / 5AM C / 3AM P

1100	1104	Pakistan, Radio	17520eu	21465eu
1100	1127	Vietnam, Voice of	7285as	
1100	1130 as	Bhutan, Bhutan BC Service	5030al	6035do
1100	1130	Netherlands, Radio	7260va	12065va
1100	1130 mtwhf	UK, BBC Caribbean Report	6195am	15190am
1100	1130 as	UK, BBC World Service	6195am	15190am
1100	1145	Germany, Deutsche Welle	15410af	17800af
1100	1200	Anguilla, Caribbean Beacon	11775am	
1100	1200 vl	Australia, ABC/Alice Springs	2310do	
1100	1200 vl	Australia, ABC/Katherine	2485do	
1100	1200 vl	Australia, ABC/Tennant Creek	2325do	
1100	1200	Australia, Christian Voice Intl	13775pa	15530as
1100	1200	Australia, Radio	6020va	9580va
		13605va	5995pa	11880as
		15400as	21820va	12080pa
1100	1200	Austria, Christian Voice	13765as	17725as
1100	1200 vl	Austria, Radio Africa	17815eu	
1100	1200 vl	Botswana, Radio	7255do	9600do
1100	1200	Canada, CBC Northern Service	9625do	
1100	1200	Canada, CFRX Toronto ON	6070do	
1100	1200	Canada, CFVP Calgary AB	6030do	
1100	1200	Canada, CHNX Halifax, NS	6130do	
1100	1200	Canada, CKZN St John's NF	6160do	
1100	1200	Canada, CKZU Vancouver BC	6160do	
1100	1200	Costa Rica, R for Peace Intl	7455irr	15040va
1100	1200	Costa Rica, University Network	5030am	6150am
		11870am	13749na	7375am
		17645as		9724sa
1100	1200	Ecuador, HCJB	12005am	15115am
1100	1200 mtwhf	Eqt Guinea, Radio Africa	15185af	21455usb
1100	1200 as/vl	Eqt. Guinea, Radio East Africa	15185af	
1100	1200 a/monthly	Finland, Scandv Weekend Radio	6170va	11720va
1100	1200	Germany, Deutsche Welle	6140eu	
1100	1200	Germany, Voice of Hope	21590me	
1100	1200 vl	Ghana, Ghana BC Corp	6130do	
1100	1200 vl/as	Ghana, Ghana BC Corp	4915do	
1100	1200	Guyana, Voice of	5950do	
1100	1200	Iran, VO Islamic Rep. of Iran	15385as	15480me
		21730va	15575as	21470va
1100	1200 as/vl	Italy, IRRS	7120va	7125al
1100	1200	Japan, Radio	6120na	9695as
1100	1200	Jordan, Radio	11690eu	15590as
1100	1200	Kenya, Kenya BC Corp	4885irr	21755as
1100	1200 vl	Lesotho, Radio	4800do	
1100	1200	Liberia, ELWA	4760do	
1100	1200	Liberia, R Liberia Intl	6100do	
1100	1200	Malaysia, Radio	7295do	
1100	1200	Malaysia, TRM Sarawak	7160do	
1100	1200	Namibia, NBC	7165af	7215af
1100	1200	New Zealand, Radio NZ Intl	15175pa	
1100	1200 vl	Nigeria, Radio/Enugu	6025do	
1100	1200 vl	Nigeria, Radio/Ibadan	6050do	

1200	1220	fa	New Zealand, Radio NZ	15190pa			
1200	1220	mtwhf	Kazakhstan, R Almaty	9620eu	11840eu		
1200	1220	as	UK, BBC Caribbean Report	6195am	6195am	15190am	
1200	1227		UK, BBC World Service	6195am	15190am		
			Iran, VO Islamic Rep. of Iran	15385as	15480me	15575as	21470va
			21730va				
1200	1230		France, Radio France Intl	15540af	25820af		
1200	1230		South Korea, R Korea Intl	9650na			
1200	1230		Uzbekistan, Radio Tashkent	5955as	5975as	6025as	9715as
1200	1245		USA, WYFR Okeechobee FL	5950na	11830na	11970na	13695na
1200	1259		Canada, Radio Canada Intl	9660as	11730as		
1200	1300		Canada, Caribbean Beacon	11775am			
1200	1300	vl	Anguilla, ABC/Alice Springs	2310do			
1200	1300	vl	Australia, ABC/Katherine	2485do			
1200	1300	vl	Australia, ABC/Tennant Creek	2325do			
1200	1300		Australia, Christian Voice Intl	13775pa	15530as	17725pa	
1200	1300		Australia, Radio 5995pa	6020va	9580va	11650pa	11880as
			1540as	21820va			
1200	1300		Austria, Christian Voice	13775as	17725as		
1200	1300		Bangladesh, Bangla Betar	7185as			
1200	1300	vl	Botswana, Radio	7255do	9600do		
1200	1300		Bulgaria, Radio	15700eu	17500eu		
1200	1300		Canada, CBC Northern Service	9625do			
1200	1300		Canada, CFRX Toronto ON	6070do			
1200	1300		Canada, CFVP Calgary AB	6030do			
1200	1300		Canada, CHNX Halifax, NS	6130do			
1200	1300		Canada, CKZN St John's NF	6160do			
1200	1300		Canada, CKZU Vancouver BC	6160do			
1200	1300		China, China Radio Intl	9730as	9760pa	11760pa	11980as
1200	1300		China, Voice of Hope	7460as			
1200	1300		Costa Rica, R for Peace Intl	15040va	21815usb		
1200	1300		Costa Rica, University Network	5030am	6150am	7375am	9724sa
			11870am	13749na	17645as		
1200	1300		Ecuador, HCJB	12005am	15115am	21455usb	
1200	1300	as/vl	Egt. Guinea, Radio East Africa	15185af			
1200	1300	a/monthly	Finland, Scand Weekend Radio	6170va		11720va	
1200	1300		Germany, Deutsche Welle	6140eu			
1200	1300		Germany, Voice of Hope	15715me			
1200	1300	vl	Ghana, Ghana BC Corp	4915do	6130do		
1200	1300		Guyana, Voice of	5950do			
1200	1300	as/vl	Italy, IRRS	7120va	7125al		
1200	1300		Kenya, Kenya BC Corp	4885ir	4915ir		
1200	1300	vl	Lesotho, Radio	4800do			
1200	1300		Liberia, R Liberia Intl	6100do			
1200	1300		Malaysia, Radio	7295do			
1200	1300		Namibia, NBC	7165af	7215af		
1200	1300		Netherlands, Radio	5965na	6045eu	9860eu	
1200	1300	vl	Nigeria, Radio/Enugu	6025do			
1200	1300	vl	Nigeria, Radio/Ibadan	6050do			
1200	1300	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1200	1300	vl	Nigeria, Radio/Lagos	4990do	7285do		
1200	1300		North Korea, VO Korea	9650va	9850va	9975va	11845va
1200	1300		Palau, KBHN/VO Hope	9965as			13650va
1200	1300	vl	Papua New Guinea, NBC	4890do	9675ir		

Shortwave Guide

M+

1200	1300	Russia, University Network	17765as		1300	1400	UK, BBC World Service	6190af	6195va	9740as	11760me	11940af	
1200	1300	Singapore, R Singapore Intl	6150as	9600as			12095eu	15190am	15310as	15360as	15420af	15485eu	
1200	1300	Taiwan, R Taipei Intl	9610pa				15575me	17640eu	17700as	17830af	17885af	21470af	
1200	1300	UK, BBC World Service	6190af	6195as	9740as	11760me	11940af					15565eu	
		12095eu	15310as	15485eu	15565eu	15575me	17640eu						
		17700as	17830af	17885af	17900as	17950af	18000as						
1200	1300	Ukraine, R Ukraine Intl	11720eu	11825na	15520na		1300	1400	USA, Armed Forces Radio	5755va	9615as		
1200	1300	USA, Armed Forces Radio	6458usb	12689usb			1300	1400	USA, KAJ Dallas TX	5755va	7510na		
1200	1300	USA, KAII Dallas TX	5755va		7510na		1300	1400	USA, KNB Anchor Point AK	9615as			
1200	1300	USA, KTBN Salt Lk City UT					1300	1400	USA, KTBN Salt Lk City UT	9615as			
1200	1300	USA, KWHR Naalehu HI	9930as				1300	1400	USA, KWHR Naalehu HI	11565pa			
1200	1300	USA, KWHR Naalehu HI	11565pa				1300	1400	USA, Voice of America	6110as	9645as	9760as	11705as
1200	1300	USA, Voice of America	6110as	9645as	9760as	11705as	1300	1400	15260me	15425as	17630af	15170me	
1200	1300	15170me	15250as	15260me	15425as	17630af	1300	1400	USA, WBCQ Monticello ME	17495na			
1200	1300	USA, WEWN Birmingham AL	5825na	7425na	15375na	15745eu	1300	1400	USA, WEWN Birmingham AL	11875na	11530na	11550na	15375na
1200	1300	USA, WHRI Noblesville IN	6040na	9495am			1300	1400	USA, WHRI Noblesville IN	6040na	15105am		
1200	1300	USA, WINB Red Lion PA	13570am				1300	1400	USA, WINB Red Lion PA	13570am			
1200	1300	USA, WJCR Upton KY	7490am	13595as			1300	1400	USA, WJCR Upton KY	7490am	13595as		
1200	1300	USA, WRMI Miami FL	9955am				1300	1400	USA, WRMI Miami FL	15725am			
1200	1300	USA, WRNO New Orleans LA	7395am				1300	1400	USA, WRNO New Orleans LA	7395am			
1200	1300	USA, WSHB Cyp Creek SC	5915as	6095am	9980as	11660am	1300	1400	USA, WSHB Cyp Creek SC	6095na	7460as	9455am	
1200	1300	USA, WTJC Newport NC	9370na				1300	1400	USA, WTJC Newport NC	9370na			
1200	1300	USA, WWCR Nashville TN	5070na	5935na	7560na	15685na	1300	1400	USA, WWCR Nashville TN	9475na	13845na	12160na	15685na
1200	1300	USA, WWFV McCaysville GA	6890va	12172va			1300	1400	USA, WWFV McCaysville GA	9400va	12172va		
1200	1300	Vanuatu, Radio	3945do	4960do	7260do		1300	1400	USA, WWFV Okeechobee FL	11550as	11740na	11830na	11970na
1200	1300	Zambia, Christian Voice	9865do				1300	1400	Zambia, Christian Voice	9865do			
1200	1300	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			1300	1400	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1206	1300	New Zealand, Radio NZ Intl	6095pa				1325	1400	Germany, Overcomer Ministries	6110eu			
1215	1300	Egypt, Radio Cairo	17595as				1330	1350	UAE, Emirates Radio	13630eu	13675eu	15395eu	21605eu
1220	1240	w					1330	1357	Vietnam, Voice of	7145eu	9730eu		
1225	1300	Kazakhstan, R Almaty	9620eu	11840eu			1330	1359	Finland, YLE/Radio Finland	15400na	17660na		
1230	1257	Sri Lanka, SLBC	6005as	9770as	15425as		1330	1400	Australia, Radio	5995pa	6020va	9475as	9580va
1230	1300	Vietnam, Voice of	9840as	12019as			1330	1400	11660as	21820va			11650pa
1230	1300	Austria, Radio Austria Intl	6155eu	13730eu			1330	1400	Austria, Radio Austria Intl	17855as			
1230	1300	Sweden, Radio	18960na				1330	1400	Germany, Voice of Hope	15675as	15715me	15775as	
1230	1300	Thailand, Radio	9655as	9810as	11905as		1330	1400	Guam, KSDA/ AWR	11755as	11980as		
1240	1300	Kazakhstan, R Almaty	9620eu	11840eu			1330	1400	India, All India Radio	11620as	13710as		
1245	1300	Seychelles, FEBRA Radio	15535me				1330	1400	Laos, Lao National Radio	7145as			
1245	1300	USA, WYFR Okeechobee FL	11830na	11970na	13695na		1330	1400	Sweden, Radio	9430va	17505va	18960na	

1300 UTC - 8AM E / 7AM C / 5AM P

1300	1310	Turkmenistan, Turkmen Radio	5015as				1400	1425	Turkey, Voice of	17690as	17815eu	
1300	1325	Netherlands, Radio	5965na	6045eu	9860eu		1400	1427	Czech Rep, Radio Prague Intl	21745va		
1300	1330	Australia, Radio	5995pa	6020va	9580va	11650pa	1300	1430	Ecuador, HCJB	12005am	15115am	21455usb
		15400as	21820va				1400	1430	Thailand, Radio	9530as	9655as	11905as
1300	1330	Egypt, Radio Cairo	17595as				1400	1430	USA, Voice of America	18275as		
1300	1330	Germany, Voice of Hope	15715me				1400	1455	S Africa, Channel Africa	11720af	17780af	21725af
1300	1330	Guam, KSDA/ AWR	15660as				1400	1500	Anguilla, Caribbean Beacon	11775am		
1300	1330	UAE, AWR Africa	17630as				1400	1500	Australia, ABC/Alice Springs	2310do		
1300	1356	North Korea, VO Korea	4405va	7505va	9335va	11335va	1300	1500	Australia, ABC/Katherine	2485do		
1300	1359	Poland, Radio Polonia	6095eu	7270eu	9525eu	11820eu	1300	1500	Australia, ABC/Tenant Creek	2325do		
1300	1400	Anguilla, Caribbean Beacon	11775am				1400	1500	Australia, Christian Voice Intl	13660pa	13775pa	15155as
1300	1400	Australia, ABC/Alice Springs	2310do				1400	1500	Australia, Radio	5995va	6080pa	9475as
1300	1400	Australia, ABC/Katherine	2485do				1400	1500	11660as	15435as		
1300	1400	Australia, ABC/Tenant Creek	2325do				1400	1500	Austria, Christian Voice	13660as	13775as	
1300	1400	Australia, Christian Voice Intl	13660pa	13775pa	15155as		1400	1500	Botswana, Radio	7255do		
1300	1400	Austria, Christian Voice	13660as	13775as			1400	1500	Canada, CBC Northern Service	9625do		
1300	1400	Botswana, Radio	7255do	9600do			1400	1500	Canada, CFRX Toronto ON	6070do		
1300	1400	Canada, CFRX Toronto ON	6070do				1400	1500	Canada, CFVP Calgary AB	6030do		
1300	1400	Canada, CHNX Halifax, NS	6130do				1400	1500	Canada, CHNX Halifax, NS	6130do		
1300	1400	Canada, CKZN St John's NF	6160do				1400	1500	Canada, CKZN St John's NF	6160do		
1300	1400	Canada, CKZU Vancouver BC	6160do				1400	1500	Canada, CKZU Vancouver BC	6160do		
1300	1400	Canada, Radio Canada Intl	9515na	13655na	17710na		1400	1500	Canada, Radio Canada Intl	9515na	13655na	17710na
1300	1400	China, China Radio Intl	7405na	9570na	11760pa	11900pa	1300	1500	China, China Radio Intl	9700as	11675as	13685af
		15180as					1400	1500	China, China Radio Intl	9700as	11675as	13685af
1300	1400	China, Voice of Hope	7460as				1400	1500	China, Voice of Hope	7460as		
1300	1400	Costa Rica, R for Peace Intl	15040va	21815usb			1400	1500	Costa Rica, R for Peace Intl	15040va	21815usb	
1300	1400	Costa Rica, University Network	5030am	6150am	7375am	9724sa	1400	1500	Costa Rica, University Network	5030am	6150am	7375am
		11870am	13749na	17645as			1400	1500	11870am	13749na	17645as	
1300	1400	Ecuador, HCJB	12005am	15115am	21455usb		1400	1500	Egypt, Guinea, Radio East Africa	15185af		
1300	1400	Egypt, Guinea, Radio East Africa	15185af				1400	1500	Finland, Scandv Weekend Radio	5990va	11720va	
1300	1400	Finland, Scandv Weekend Radio	6170va	11720va			1400	1500	France Radio France Intl	9580as	11600me	17620me
1300	1400	Germany, Deutsche Welle	6140eu				1400	1500	Germany, Deutsche Welle	6140eu		
1300	1400	Ghana, Ghana BC Corp	4915do	6130do			1400	1500	Germany, Overcomer Ministries	6110eu	13810af	
1300	1400	Guyana, Voice of	5950do				1400	1500	Ghana, Ghana BC Corp	4915do	6130do	
1300	1400	Italy, IRRS	7120va	7125al			1400	1500	Guyana, Voice of	5950do		
1300	1400	Jordan, Radio	11690eu	17680al			1400	1500	India, All India Radio	11620as	13710as	
1300	1400	Kenya, Kenya BC Corp	4885irr	4915irr			1400	1500	Italy, IRRS	7120va	7125al	
1300	1400	Kenya, Kenya BC Corp	4885irr	4915irr			1400	1500	Japan, Radio	7200as	9505na	9845as
1300	1400	Lesotho, Radio	4800do				1400	1500	Jordan, Radio	11690eu	17680al	
1300	1400	Liberia, R Liberia Intl	6100do				1400	1500	Kenya, Kenya BC Corp	4885irr	4915irr	
1300	1400	Malaysia, Radio	7295do				1400	1500	Lesotho, Radio	4800do		
1300	1400	Namibia, NBC	7165af	7215af			1400	1500	Liberia, R Liberia Intl	6100do		
1300	1400	New Zealand, Radio NZ Intl	6095pa				1400	1500	Malaysia, Radio	7295do		
1300	1400	Nigeria, Radio/Enugu	6025do				1400	1500	Malaysia, RTM Sarawak	7160do		
1300	1400	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	1300	1500	Namibia, NBC	7165af	7215af	
1300	1400	Nigeria, Radio/Lagos	4990do	7285do			1400	1500	New Zealand, Radio NZ Intl	6095pa		
1300	1400	Papua New Guinea, NBC	4890do	9675irr			1400	1500	Nigeria, Radio/Enugu	6025do		
1300	1400	Russia, University Network	17765as				1400	1500	Nigeria, Radio/Ibadan	6050do		
1300	1400	S Africa, Channel Africa	11720af	17780af	21725af		1400	1500	Nigeria, Radio/Kaduna	4770do	6090do	7275do
1300	1400	Singapore, R Singapore Intl	6150as	9600as			1400	1500	Nigeria, Radio/Lagos	4990do	7285do	9570do
1300	1400	South Korea, R Korea Intl	9570as	13670am			1400	1500	Oman, Radio	15140va		
1300	1400	Sri Lanka, SLBC	6005as	9770as	15425as		1400	1500	Palau, KHBN/VO Hope	9965as		
1300	1400	Uganda, Radio	5026do	7196do			1400	1500	Palau, KHBN/VO Hope	9965as		

1300	

Shortwave Guide



1400	1500	Romania, R Romania Intl	11940eu	15365eu	17790eu		1500	1600	vl	Nigeria, Radio/Lagos	4990do	7285do
1400	1500	Russia, University Network	17765as				1500	1600		Russia, University Network	17765as	
1400	1500	Singapore, SBC Radio One	6150do				1500	1600		Russia, Voice of Russia	6205as	7260na
1400	1500	Sri Lanka, SLBC	6005as	9770as	15425as		1500	1600		Russia, World Beacon	15340eu	7315as
1400	1500	Taiwan, R Taipei Intl	15265as				1500	1600		Singapore, SBC Radio One	6150do	
1400	1500	Uganda, Radio	5026do	7196do			1500	1600		Sri Lanka, SLBC	6005as	9770as
1400	1500	UK, BBC World Service	6135as	6190af	6195as	9740as	1500	1600		Uganda, Radio	5026do	7196do
			12095eu	15190am	15310as	15485eu	1500	1600		UK, BBC World Service	5975as	6135as
			17700as	17830af	21470af	15565eu	15575me	17640eu		12095eu	15190am	15400af
1400	1500	USA, Armed Forces Radio	6458usb	12689usb			1500	1600		UK, World Beacon	15340eu	
1400	1500	USA, KAJ Dallas TX	13815va				1500	1600		USA, Armed Forces Radio	6458usb	12689usb
1400	1500	USA, KJES Vado NM	11715na				1500	1600		USA, KAJ Dallas TX	13815va	
1400	1500	USA, KTBN Salt Lk City UT	7510na				1500	1600		USA, KJES Vado NM	11715na	
1400	1500	USA, KWHR Naalehu HI	9930as				1500	1600		USA, KTBN Salt Lk City UT	7510na	
1400	1500	USA, KWHR Naalehu HI	11565pa				1500	1600		USA, KWHR Naalehu HI	9930as	
1400	1500	USA, Voice of America	6110as	7125as	9645as	9760as	1500	1600	as	USA, KWHR Naalehu HI	11565pa	
1400	1500	USA, WBCQ Monticello ME	17495na				1500	1600		USA, VOA Special English	6110as	9760as
1400	1500	USA, WEWN Birmingham AL	11875na	11530na	11550na	15375na	1500	1600		USA, WBCQ Monticello ME	9335na	17495na
			15745eu				1500	1600		USA, WEWN Birmingham AL	11875na	11550na
1400	1500	USA, WHRI Noblesville IN	6040na	15105am			1500	1600		USA, WHRI Noblesville IN	15745eu	
1400	1500	USA, WINB Red Lion PA	13750am				1500	1600		USA, WINB Red Lion PA	6040na	15105am
1400	1500	USA, WJCR Upton KY	13595as				1500	1600		USA, WJCR Upton KY	13595as	
1400	1500	USA, WRMI Miami FL	15725am				1500	1600		USA, WRMI Miami FL	13595as	
1400	1500	USA, WRNO New Orleans LA	7395am				1500	1600		USA, WRNO New Orleans LA	15725am	
1400	1500	USA, WTJC Newport NC	9370na				1500	1600		USA, WTJC Newport NC	7395am	
1400	1500	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	1500	1600		USA, WWCR Nashville TN	9475na	12160na
1400	1500	USA, WWFV McCaysville GA	9400va	12172va			1500	1600		USA, WWFV McCaysville GA	13845na	15685na
1400	1500	USA, WYFR Okeechobee FL	11550as	11740na	11830na	17510sa	1500	1600		USA, WYFR Okeechobee FL	9400va	12172va
			17575sa	17760na			1500	1600		Zambia, Christian Voice	4965do	
1400	1500	Zambia, Christian Voice	9865do				1500	1600		Zambia, Christian Voice	17575sa	
1400	1500	vl					1500	1600		Zimbabwe, Zimbabwe BC Corp	5975do	6045do
1415	1420	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			1515	1545	twf	Seychelles, FEBA Radio	11600as	
1430	1500	Nepal, Radio	3230as	5005as			1515	1600	m	Seychelles, FEBA Radio	11600as	
1430	1500	Austria, Radio Austria Intl	6155eu	13730eu			1530	1600	vl	Botswana, Radio	3356do	4820do
1430	1500	Germany, Voice of Hope	15715me	15775as			1530	1600		Iran, VO Islamic Rep. of Iran	9605as	11775eu
1430	1500	Guam, KSDA/AVR	15660as				1530	1600	as	Seychelles, FEBA Radio	11600as	11870as
1430	1500	Guam, KTWR/TWR	15330as				1530	1600		USA, Voice of America	7125as	9575as
1430	1500	Malaysia, RTM Kota Kinabalu	5980do				1535	1600		15120me	15205as	15265me
1430	1500	Myanmar, Radio	5985do				1550	1600		Germany, Voice of Hope	15395as	
1430	1500	Netherlands, Radio	12070as	12080as	15220na	15595as				Vatican City, Vatican Radio	9865au	13765au
1430	1500	Sweden, Radio	17505va	18960na							15235au	15235au
1445	1500	Seychelles, FEBA Radio	11600as									

1500 UTC - 10AM E / 9AM C / 7AM P

1500	1530	Mexico, Radio Mexico Intl	9705am	11770am			1600	1610		Vatican City, Vatican Radio	9865au	13765au
1500	1530	Mongolia, Voice of	12015as				1600	1615		Pakistan, Radio	11570me	15100me
1500	1530	S Africa, Channel Africa	17770af				1600	1625		Netherlands, Radio	12070as	12080as
1500	1530	Seychelles, FEBA Radio	11600as				1600	1627		Iran, VO Islamic Rep. of Iran	9605as	11775eu
1500	1530	USA, Voice of America	7125as	9645as	15205as	15395as	1600	1627		Vietnam, Voice of	7145eu	9730eu
1500	1535	Germany, Voice of Hope	15715me	15775as			1600	1630		Mexico, Radio Mexico Intl	9705am	11770am
1500	1556	North Korea, VO Korea	4405va	7505va	9335va	11335va	1600	1630		S Africa, Channel Africa	9525af	
1500	1600	Anguilla, Caribbean Beacon	11775am				1600	1630		Zimbabwe, Zimbabwe BC Corp	5975da	6045do
1500	1600	Australia, ABC/Alice Springs	2310do				1600	1635		UAE, Emirates Radio	13630eu	13675eu
1500	1600	Australia, ABC/Katherine	2485do				1600	1645	a/monthly	Finland, Scandv Weekend Radio	5990va	11720va
1500	1600	Australia, ABC/Tennant Creek	2325do				1600	1645		Germany, Deutsche Welle	6170as	7225as
1500	1600	Australia, Christian Voice Intl	13660pa	13775pa	15155as		1600	1650		13605as	15455af	21840af
1500	1600	Australia, Radio	5995va	6080pa	9475as	9580va	1600	1656		New Zealand, Radio NZ Intl	6095pa	
			11660va	15435as			1600	1656		North Korea, VO Korea	9975va	
1500	1600	Austria, Christian Voice	13660as	13775as			1600	1659	as	Canada, Radio Canada Intl	11715na	13655na
1500	1600	vl					1600	1700		Algeria, Radio Algiers Intl	11715eu	15160eu
1500	1600						1600	1700		Anguilla, Caribbean Beacon	11775am	
1500	1600	Botswana, Radio	7255do	9600do			1600	1700		Australia, ABC/Alice Springs	2310do	
1500	1600	Canada, CBC Northern Service	9625do				1600	1700		Australia, ABC/Katherine	2485do	
1500	1600	Canada, CFRX Toronto ON	6070da				1600	1700		Australia, ABC/Tennant Creek	2325do	
1500	1600	Canada, CFVP Calgary AB	6030da				1600	1700		Australia, Christian Voice Intl	7170pa	13660pa
1500	1600	Canada, CHNX Halifax, NS	6130da				1600	1700		Australia, Radio	5995va	15115as
1500	1600	Canada, CKZN St John's NF	6160da				1600	1700		16080pa	9580va	9655va
1500	1600	Canada, CKZU Vancouver BC	6160da				1600	1700		11660va		11650pa
1500	1600	Canada, Radio Canada Intl	9515na	13655na	15360as	17710na	1600	1700		Austria, Christian Voice	7170as	13660as
			17820as				1600	1700		Botswana, Radio	3356do	4820do
1500	1600	China, China Radio Intl	9785as				1600	1700		Canada, CBC Northern Service	9625do	
1500	1600	China, Voice of Hope	7460as				1600	1700		Canada, CFRX Toronto ON	6070da	
1500	1600	Costa Rica, R for Peace Intl	15040va	21815usb			1600	1700		Canada, CFVP Calgary AB	6030da	
1500	1600	Costa Rica, University Network	5030am	6150am	7375am	9724sa	1600	1700		Canada, CHNX Halifax, NS	6130da	
			11870am	13749na	17645as		1600	1700		Canada, CKZN St John's NF	6160da	
1500	1600	Eqt. Guinea, Radio East Africa	15185af				1600	1700		Canada, CKZU Vancouver BC	6160da	
1500	1600	Finland, Scandv Weekend Radio	5990va	11720va			1600	1700		China, China Radio	13650af	
1500	1600	Germany, Deutsche Welle	6140eu				1600	1700		Costa Rica, R for Peace Intl	15040va	21815usb
1500	1600	Germany, Overcomer Ministries	6110eu	13810af			1600	1700		Costa Rica, University Network	5030am	6150am
1500	1600	Glana, Ghana BC Corp	4915do	6130do			1600	1700		11870am	13749na	15235sa
1500	1600	Guam, KTWR/TWR	15330as				1600	1700		Ethiopia, Radio	5990do	7110af
1500	1600	Guyana, Voice of	5950do				1600	1700		France, Radio France Intl	11615af	11995af
1500	1600	Italy, IRRS	7120va	7125al			1600	1700		17850af		12015af
1500	1600	Japan, Radio	7200as	9505na	9750as	9845as	1600	1700		Germany, Deutsche Welle	6140eu	
1500	1600	Jordan, Radio	11690eu	17680al			1600	1700		Germany, Overcomer Ministries	6110eu	
1500	1600	Kenya, Kenya BC Corp	4885irr	4915irr			1600	1700		Germany, Voice of Hope	15715af	
1500	1600	Lesotho, Radio	4800do				1600	1700		Ghana, Ghana BC Corp	4915do	6130do
1500	1600	Liberia, R Liberia Intl	6100do				1600	1700		Guyana, Voice of	5950do	
1500	1600	Malaysia, Radio	7295do				1600	1700		Jordan, Radio	11690na	
1500	1600	Malaysia, RTM Kota Kinabalu	5980do				1600	1700		Kenya, Kenya BC Corp	4885irr	4915irr
1500	1600	Malaysia, RTM Sarawak	7160do				1600	1700		Lesotho, Radio	4800do	
1500	1600	Myanmar, Radio	5985do				1600	1700		Liberia, R Liberia Intl	6100do	
1500	1600	Namibia, NBC	7165af	7215af			1600	1700		Malaysia, Radio	7295do	
1500	1600	Netherlands, Radio	12070as	12080as	15220na	15595as	1600	1700		Namibia, NBC	7165af	7215af
1500	1600	New Zealand, Radio NZ Intl	6095pa				1600	1700		Nigeria, Radio/Enugu	6025do	
1500	1600	Nigeria, Radio/Ibadan	6050do				1600	1700		Nigeria, Radio/Ibadan	6050do	
1500	1600	Nigeria, Radio/Kaduna	4770da	6090do	7275do	9570do	1600	1700		Nigeria, Radio/Kaduna	4770da	6090do

Shortwave Guide

M+

1600	1700	vl	Nigeria, Radio/Lagos	3326do	4990do		1700	1800	Russia, University Network	17765as	
1600	1700		Russia, University Network	17765as			1700	1800	Russia, Voice of Russia	9470me	9830me
1600	1700		Russia, Voice of Russia	4940as	4965as	4975as	6005me	7260na	Russia, World Beacon	9575eu	15735am
1600	1700		7305as	9830me	15735am			Sierra Leone, SLBS	3316do		
1600	1700		Russia, World Beacon	15340eu				Taiwan, R Taipei Intl	11550as		
1600	1700		South Korea, R Korea Intl	5975om	9515af	9870af		Uganda, Radio	5026do	7196do	
1600	1700		Taiwan, R Taipei Intl	11550as				UK, BBC World Service	3255af	3915as	
1600	1700		Uganda, Radio	5026do	7196do		6195eu	9410eu	5975as	6005af	
1600	1700		UK, BBC World Service	3915as	5975as	6190af	7160as	9510as	6190af	6190af	
1600	1700		9410eu	9740as	11940af	12095eu	15190am	15310as	15400af	9630af	9740as
1600	1700		15565eu	17700as	17830af	21470af	21660af		15420af	15565as	15400af
1600	1700		UK, World Beacon	15340eu				UK, World Beacon	9575eu		
1600	1700		USA, Armed Forces Radio	6458usb	12689usb			USA, Armed Forces Radio	6458usb	12689usb	
1600	1700		USA, KAJ Dallas TX	13815va				USA, KAJ Dallas TX	13815va		
1600	1700		USA, KJES Vado NM	11715na				USA, KTBN Salt Lk City UT	15590na		
1600	1700		USA, KTBN Salt Lk City UT	15590na				USA, KWHR Naalehu HI	9930as		
1600	1700		USA, KWHR Naalehu HI	9930as				USA, Voice of America	6040af	6110as	7125as
1600	1700		USA, VOA Special English	13600af	15445af	17640af		13710af	15205as	15395as	9645as
1600	1700		USA, Voice of America	6035af	6110as	7125as	9645as	15240af	15395as	15445af	9760as
1600	1700		9760as	11950me	13710af	13735me	15120me	15205as	15240af	15395as	15445af
1600	1700		15395as	15485af	17715af	17895af		USA, WBCQ Monticello ME	11955as	12005as	12525as
1600	1700		USA, WBCQ Monticello ME	9335na	17495na			USA, WBCQ Monticello ME	9335na	17495na	
1600	1700		USA, WEWN Birmingham AL	11530na	11550na	13615na	15375na	USA, WEWN Birmingham AL	11530na	11550na	13615na
1600	1700		15745eu					USA, WHRA Greenbush ME	17650af		
1600	1700		USA, WHRA Noblesville IN	17650af				USA, WHRI Noblesville IN	13760va	15105am	
1600	1700		USA, WINB Red Lion PA	13570am	13760va	15105am		USA, WINB Red Lion PA	13570am		
1600	1700		USA, WJCR Upton KY	7490am	13595as			USA, WJCR Upton KY	7490am	13595as	
1600	1700		USA, WRMI Miami FL	15725am				USA, WMLK Bethel PA	15265eu		
1600	1700		USA, WRNO New Orleans LA	7395am	15420am			USA, WRMI Miami FL	15725am		
1600	1700		USA, WSHB Cyp Creek SC	18910af				USA, WRNO New Orleans LA	7395am	15420am	
1600	1700		USA, WTJC Newport NC	9370na				USA, WSHB Cyp Creek SC	18910af		
1600	1700		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	USA, WTJC Newport NC	9370na		
1600	1700		USA, WWFV McCaysville GA	9400va	12172va			USA, WWCR Nashville TN	9475na	12160na	13845na
1600	1700		USA, WWFR Okeechobee FL	11830na	13855af	15525as	17760na	USA, WWFV McCaysville GA	9400va	12172va	15685na
1600	1700		18980eu	21455eu	21525af			USA, WYFR Okeechobee FL	13855af	18980eu	21455eu
1600	1700		Zambia, Christian Voice	4965do				Zambia, Christian Voice	4965do		
1615	1700	as	UK, BBC World Service	11860af	15420af	21490af		UK, BBC World Service	11860af		
1630	1700		Austria, Radio Austria Intl	17865na				Austria, Radio Austria Intl	17865na		
1630	1700		Egypt, Radio Cairo	15255af				Egypt, Radio Cairo	15255af		
1630	1700		Georgia, Georgian Radio	6180me				Georgia, Georgian Radio	6180me		
1630	1700		Guam, KSDA/ AWR	11980as				Guam, KSDA/ AWR	11980as		
1630	1700		UAE, AWR Africa	9890eu				UAE, AWR Africa	9890eu		
1630	1700	as	UK, BBC World Service	11860af	21490af			UK, BBC World Service	11860af		
1630	1700	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do			Zimbabwe, Zimbabwe BC Corp	4828do		
1645	1700	a/monthly	Finland, Scandv Weekend Radio	6170va	11720va			Finland, Scandv Weekend Radio	6170va		
1645	1700		Tajikistan, Radio	7245as				Tajikistan, Radio	7245as		
1650	1700		New Zealand, Radio NZ Intl	11725pa				New Zealand, Radio NZ Intl	11725pa		

1700 UTC - 12PM E / 11AM C / 9AM P

1700	1725		Germany, Overcomer Ministries	6110eu			1700	1810	Zambia, National BC Corp	6265do	
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485eu		1800	1815	Bangladesh, Bangla Betar	7185eu	9550eu
1700	1727		Vietnam, Voice of	12070eu			1800	1827	Vietnam, Voice of	5955eu	9730eu
1700	1730	a/monthly	Finland, Scandv Weekend Radio	6170va	11720va		1800	1830	Azerbaijan, Voice of	6110eu	9155eu
1700	1730		France Radio France Intl	11615af	15605af	17605af	1800	1830	Egypt, Radio Cairo	15255af	
1700	1730		Israel, Kol Israel	11605va	17545va		1800	1830	Germany, Deutsche Welle	3995eu	
1700	1730		Jordan, Radio	11690na	17680al		1800	1830	Germany, Universal Life	11840af	
1700	1730	mtwhfa	Malta, VO Mediterranean	6110eu	9840eu		1800	1830	S Africa, AVR Africa	5960af	6100af
1700	1730		S Africa, Channel Africa	17870af			1800	1830	S Africa, Channel Africa	17870af	
1700	1750		New Zealand, Radio NZ Intl	11725pa			1800	1830	UK, RTE Radio	9895me	
1700	1800	vl	Anguilla, Caribbean Beacon	11775am			1800	1857	Czech Rep, Radio Prague Intl	5930eu	7315va
1700	1800	vl	Australia, ABC/Alice Springs	2310do			1800	1858	Yemen, Rep of Yemen Radio	9780me	
1700	1800	vl	Australia, ABC/Katherine	2485do			1800	1859	Poland, Radio Polonia	5995eu	
1700	1800	vl	Australia, ABC/Tennant Creek	2325do			1800	1900	Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, Christian Voice Intl	7170pa	13660pa	15115as	1800	1900	Australia, ABC/Alice Springs	2310do	
1700	1800		Australia, Radio	5995va	6080pa	9580va	1800	1900	Australia, ABC/Katherine	2485do	
1700	1800		11880va			1800	1900	Australia, ABC/Tennant Creek	2325do		
1700	1800		Austria, Christian Voice	7170as	13660as		1800	1900	Australia, Christian Voice Intl	7170pa	9795pa
1700	1800	vl	Botswana, Radio	3356do	4820do	7255do	1800	1900	Australia, Radio	6080as	7240pa
1700	1800		Canada, CBC Northern Service	9625do			1800	1900	Austria, Christian Voice	7170as	9795as
1700	1800		Canada, CFRX Toronto ON	6070do			1800	1900	Botswana, Radio	3356do	4820do
1700	1800		Canada, CFVP Calgary AB	6030do			1800	1900	Canada, RTV	4850do	6005do
1700	1800		Canada, CHNX Halifax, NS	6130do			1800	1900	Canada, CBC Northern Service	9625do	
1700	1800		Canada, CKZN St John's NF	6160do			1800	1900	Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CKZU Vancouver BC	6160do			1800	1900	Canada, CFVP Calgary AB	6030do	
1700	1800		China, China Radio Intl	7150af	9570af	9695af	11910af	15125af	Canada, CHNX Halifax, NS	6130do	
1700	1800		Costa Rica, R for Peace Intl	15040va	21815usb		1800	1900	Canada, CKZN St John's NF	6160do	
1700	1800		Costa Rica, University Network	5030am	6150am	7375am	9724sa		Canada, CKZU Vancouver BC	6160do	
1700	1800		11870am 13749na	17645as			1800	1900	Costa Rica, R for Peace Intl	15040va	21815usb
1700	1800	mtwhf	Egypt, Radio Cairo	15255af			1800	1900	Costa Rica, University Network	5030am	6150am
1700	1800		Egypt, Radio Africa	15185af			1800	1900	11870am 13749na	17645as	
1700	1800		Germany, Deutsche Welle	6140eu			1800	1900	Egypt, Radio Africa	15185af	
1700	1800		Germany, Unt. Methodist Church	11735af	13820af		1800	1900	Finland, Scandv Weekend Radio	6170va	11690va
1700	1800		Germany, Voice of Hope	9815eu			1800	1900	Germany, Deutsche Welle	6140eu	
1700	1800	vl	Ghana, Ghana BC Corp	3366do	4915do		1800	1900	Germany, Unt. Methodist Church	11735af	13820af
1700	1800	a	Greece, Voice of	9420eu	11645eu	15630eu	17705na		Germany, Voice of Hope	9815eu	
1700	1800		Guyana, Voice of	5950do	11970eu	15355af			Ghana, Ghana BC Corp	3366do	4915do
1700	1800		Japan, Radio	9505na			1800	1900	January 2002	9724sa	
1700	1800		Kenya, Kenya BC Corp	4885irr	4915irr		1800	1900	MONITORING TIMES	9724sa	
1700	1800	vl	Lesotho, Radio	4800do			1800	1900	15160pa	17375am	
1700	1800		Liberia, R Liberia Intl	6100do			1800	1900	17375am	9724sa	
1700	1800		Namibia, NBC	3270af	3290af	7215irr					
1700	1800	vl	Nigeria, Radio/Enugu	6025do			1800	1900			
1700	1800	vl	Nigeria, Radio/Ibadan	6050do			1800	1900			
1700	1800	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do				
1700	1800	vl	Nigeria, Radio/Lagos	3326do	4990do	11830eu	11940eu	15245eu			
1700	1800		Romania, R Romania Intl	9625af			1800	1900			

1700	1800		Russia, University Network	17765as	19470me	9830me	1700	1800	Russia, Voice of Russia	7260na	
1700	1800		Russia, World Beacon	9575eu			1700	1800	Russia, World Beacon	9575eu	
1700	1800		Sierra Leone, SLBS	3316do			1700	1800	Sierra Leone, SLBS	3316do	
1700	1800		Taiwan, R Taipei Intl	11550as			1700	1800	Taiwan, R Taipei Intl	11550as	
1700	1800		Uganda, Radio	5026do	7196do		1700	1800	Uganda, Radio	5026do	
1700	1800		UK, BBC World Service	3255af	3915as		1700	1800	UK, BBC World Service	3255af	
1700	1800		6195eu	7160as	9410eu		1700	1800	UK, BBC World Service	3255af	
1700	1800		15160pa	17830af	21470af						

Shortwave Guide



1800	1900	Guyana, Voice of India, All India Radio	5950do 17670af	7410as	11620eu	11935va	13605af	15155af	1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do
1800	1900	Italy, IRRS	3980al	3985va					1900	2000	vl	Guyana, Voice of Italy, IRRS	5950do 3980al	3985va
1800	1900	Kenya, Kenya BC Corp	4885irr	4915irr					1900	2000		Kenya, Kenya BC Corp	4885irr	4915irr
1800	1900	Kuwait, Radio	11990va						1900	2000		Kuwait, Radio	11990va	
1800	1900	Lesotho, Radio	4800do						1900	2000		Lesotho, Radio	4800do	
1800	1900	Liberia, ELWA	4760do						1900	2000		Liberia, ELWA	4760do	
1800	1900	Liberia, R Liberia Intl	5100do						1900	2000		Liberia, R Liberia Intl	5100do	
1800	1900	Namibia, NBC	3270af	3290af	7215irr				1900	2000		Namibia, NBC	3270af	3290af
1800	1900	Netherlands, Radio	6020af	11655af					1900	2000		Netherlands, Radio	6020af	9895af
1800	1900	New Zealand, Radio NZ Intl	15160pa						1900	2000	vl	New Zealand, Radio NZ Intl	15160pa	11655af
1800	1900	Nigeria, Radio/Enugu	6025do						1900	2000	vl	Nigeria, Radio/Enugu	6025do	
1800	1900	Nigeria, Radio/Ibadan	6050do						1900	2000	vl	Nigeria, Radio/Ibadan	6050do	
1800	1900	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do			1900	2000	vl	Nigeria, Radio/Kaduna	4770do	6090do
1800	1900	Nigeria, Radio/Lagos	3326do	4990do					1900	2000	vl	Nigeria, Radio/Lagos	3326do	4990do
1800	1900	Philippines, Radio Pilipinas	11730me	11890me	15190me				1900	2000		Nigeria, Voice of	7255af	11770af
1800	1900	Russia, University Network	17765as						1900	2000		Russia, University Network	17765as	
1800	1900	Russia, Voice of Russia	5940eu	6175eu					1900	2000		Russia, Voice of Russia	5940eu	5950eu
1800	1900	Russia, Voice of Russia	7260na	7335af	7340eu	9775eu	9830af		1900	2000		Russia, Voice of Russia	7260na	6175eu
1800	1900	Russia, Voice of Russia	11510af	15735an					1900	2000		Russia, World Beacon	3230af	17850af
1800	1900	Russia, World Beacon	3230af	9575eu	17850af				1900	2000		S Africa, African Beacon	3230af	
1800	1900	S Africa, African Beacon	3230af						1900	2000		Sierra Leone, SLBS	3316do	
1800	1900	Sierra Leone, SLBS	3316do						1900	2000	vl	Solomon Islands, SIBC	5020do	
1800	1900	Swaziland, TWR	3200af	9500af					1900	2000		South Korea, R Korea Intl	5975om	7275eu
1800	1900	Taiwan, R Taipei Intl	3955eu						1900	2000		Swaziland, TWR	3200af	
1800	1900	Uganda, Radio	5026do	7196do					1900	2000		Thailand, Radio	9535eu	9655eu
1800	1900	UK, BBC World Service	9525af	5975as	6190af	6195eu	9410eu		1900	2000		Uganda, Radio	5026do	11905eu
1800	1900	UK, BBC World Service	9510as	19740na	15400af	15420af	17830af	21470af	1900	2000		UK, BBC World Service	9630af	12095af
1800	1900	UK, World Beacon	3230af	9575eu	17850af				1900	2000		UK, World Beacon	3230af	17850af
1800	1900	USA, Armed Forces Radio		6458usb	12689usb				1900	2000		USA, Armed Forces Radio	6458usb	12689usb
1800	1900	USA, KAJ Dallas TX	13815va						1900	2000		USA, KAJ Dallas TX	13815va	
1800	1900	USA, KTBN Salt Lk City UT	15590na						1900	2000		USA, KJES Vado NM	15385au	
1800	1900	USA, KWHR Naalehi HI	9930as						1900	2000		USA, KTBN Salt Lk City UT	15590na	
1800	1900	USA, Voice of America	6035af	6040af	9760as	9840as	11975af		1900	2000		USA, KWHR Naalehi HI	9930as	
1800	1900	USA, WBCQ Monticello ME	9335na	17495na					1900	2000		USA, Voice of America	4950af	6035af
1800	1900	USA, WEWN Birmingham AL	11530na	11550na	13615na	15745na			1900	2000	mtwhf	USA, Voice of America	5965me	9840as
1800	1900	USA, WHRA Greenbush ME	17650af						1900	2000		USA, Voice of America	15205me	11720as
1800	1900	USA, WHRI Noblesville IN	9495am	13760va					1900	2000		USA, WHRI Noblesville IN	15410as	11970as
1800	1900	USA, WINB Red Lion PA	13570am						1900	2000		USA, WBCQ Monticello ME	9335na	17495na
1800	1900	USA, WJCR Upton KY	7490am	13595as					1900	2000		USA, WEWN Birmingham AL	11550na	13615na
1800	1900	USA, WMLK Bethel PA	15265eu						1900	2000		USA, WHRI Noblesville IN	17545na	
1800	1900	USA, WRMI Miami FL	15725am						1900	2000		USA, WHRA Greenbush ME	17650af	
1800	1900	USA, WRNO New Orleans LA	7395am	15420am					1900	2000		USA, WJCR Upton KY	9495am	13760va
1800	1900	USA, WSHB Cyp Creek SC	15665eu	18910af					1900	2000		USA, WMLK Bethel PA	15265eu	13595as
1800	1900	USA, WTJC Newport NC	9370na						1900	2000		USA, WRMI Miami FL	15725am	
1800	1900	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na			1900	2000		USA, WRNO New Orleans LA	7395am	15420am
1800	1900	USA, WWFV McCaysville GA	9400va	12172va					1900	2000		USA, WSHB Cyp Creek SC	15665eu	18910af
1800	1900	USA, WYFR Okeechobee FL	18980eu						1900	2000		USA, WTJC Newport NC	9370na	
1800	1900	Zambia, Christian Voice	4965do						1900	2000		USA, WWCR Nashville TN	9475na	12160na
1800	1900	Zimbabwe, Zimbabwe BC Corp	4828do	6045do					1900	2000		USA, WWFV McCaysville GA	9400va	13845na
1815	1900	Bangladesh, Bangla Betar	7185eu	9550eu	15520eu				1900	2000		USA, WYFR Okeechobee FL	13855af	15685na
1830	1855	Belgium, RVI Flanders R Intl	9925eu	13685eu	13710va				1900	2000		Zambia, Christian Voice	4965do	
1830	1900	Georgia, Georgian Radio	6230eu						1900	2000		Zimbabwe, Zimbabwe BC Corp	4828do	6045do
1830	1900	Georgia, Georgian Radio	6080as						1904	1930	s	Greece, Voice of	5865eu	7475eu
1830	1900	Netherlands, Radio	9895af	17605af					1930	2000		Austria, Radio Austria Intl	5945eu	71705na
1830	1900	Sweden, Radio	6065va						1930	2000		Georgia, Georgian Radio	6115eu	
1830	1900	Sweden, Radio	5840va						1930	2000	s	Greece, Voice of	5865eu	7475eu
1830	1900	UK, RTE Radio	13640na	21630af					1930	2000		Iran, VO Islamic Rep. of Iran	6110eu	7705na
1830	1900	USA, Voice of America	13675af	15160af	17640af				1930	2000		Papua New Guinea, NBC	4890do	6110eu
1845	1900	Congo, RTV Congolaise	4765af	5985af					1930	2000		Slovakia, R Slovakia Intl	6055eu	6110eu
									1930	2000		Switzerland, Swiss R Intl	9605af	6055eu
									1930	2000		Turkey, Voice of	7125eu	
									1935	1955		Yugoslavia, Radio	6100eu	
									1945	2000		Italy, RAI Intl	9570eu	9760eu
												Albania, Radio Tirana Intl	7210eu	9510eu

1900 UTC - 2PM E / 1PM C / 11AM P

1900	1915	Congo, RTV Congolaise	4765do	5985af					2000	2015		Swaziland, TWR	3200af	
1900	1927	Vietnam, Voice of	7145eu	9730eu					2000	2020		Turkey, Voice of	7125eu	
1900	1930	Germany, Deutsche Welle	3995eu						2000	2025		Netherlands, Radio	6020af	9895af
1900	1930	Philippines, Radio Pilipinas	11730me	11890me	15190me				2000	2027		Iran, VO Islamic Rep. of Iran	6110eu	9890eu
1900	1930	USA, VOA Special English	9785me	12015me	13640me				2000	2030		Austria, Christian Voice	7170as	9795as
1900	1945	Germany, Deutsche Welle	11765af	11810af	13780af	15275af			2000	2030		Hungary, Radio Budapest	6025eu	7135eu
1900	1945	India, All India Radio	7410as	11620eu	11935va	13605af	15155af		2000	2030		Israel, Kol Israel	9435va	11605va
1900	1945	India, All India Radio	17670af						2000	2030		Mongolia, Voice of	12015as	15640af
1900	1956	North Korea, VO Korea	7505va	11335va					2000	2030		S Africa, AWR Africa	17695af	15650va
1900	2000	Anguilla, Caribbean Beacon	11775am						2000	2030		Switzerland, Swiss R Intl	9605af	17660me
1900	2000	Argentina, RAE	9690va	15345va					2000	2030		USA, Voice of America	4950af	13660af
1900	2000	Australia, ABC/Katherine	2485do						2000	2045		9760as	11855af	15485af
1900	2000	Australia, ABC/Tennant Creek	2325do						2000	2100		11975af	13710af	17760me
1900	2000	Australia, Christian Voice Intl	7170pa	9795pa					2000	2100		Vatican City, Vatican Radio	9660af	11625af
1900	2000	Australia, Radio	6080as	7240pa	9500as	9580va	9815as		2000	2100		Germany, Deutsche Welle	6180eu	13765af
1900	2000	Austria, Christian Voice	9795as						2000	2100		Algeria, Radio Algiers Intl	11715eu	15160eu
1900	2000	Botswana, Radio	3356do	4820do					2000	2100		Anguilla, Caribbean Beacon	11775am	
1900	2000	Cameroon, RTV	4850do	6005do					2000	2100		Australia, ABC/Alice Springs	2310do	
1900	2000	Canada, CFRX Toronto ON	6070do						2000	2100		Australia, ABC/Katherine	2485do	
1900	2000	Canada, CFVP Calgary AB	6030do						2000	2100		Australia, ABC/Tennant Creek	2325do	
1900	2000	Canada, CHNX Halifax, NS	6130do						2000	2100		Australia, Christian Voice Intl	7170pa	9795pa
1900	2000	Canada, CKZN St John's NF	6160do						2000	2100		Australia, Radio	6080as	11880va
1900	2000	Canada, CKZU Vancouver BC	6160do						2000	2100		12080pa		
1900	2000	Canada, CBC Northern Service	9625do						2000	2100		Botswana, Radio	3356do	4820do
1900	2000	China, China Radio Int'l	9440af	9585af	13790af									

Shortwave Guide

M-7

2000	2100	vl	Cameroon, RTV	4850do	6005do	2100	2130	Australia, Radio	7240pa	9500as	9580va	9660pa	11880va
2000	2100		Canada, CBC Northern Service	9625do		2100	2130	12080pa	17715va	21740va			
2000	2100		Canada, CFRX Toronto ON	6070do		2100	2130	Austria, Christian Voice	7170as		11935pa		
2000	2100		Canada, CFVP Calgary AB	6030do		2100	2130	China, China Radio Intl	13640af		15125af		
2000	2100		Canada, CHNX Halifax, NS	6130do		2100	2130	Cuba, Radio Havana	13660usb		13750eu		
2000	2100		Canada, CKZN St John's NF	6160do		2100	2145	Germany, Deutsche Welle	15410af	17835af		9615af	9960af
2000	2100		Canada, CKZU Vancouver BC	6160do		2100	2145	Iraq, Radio Iraq Intl	7157rr	9887irr	11787irr		15275pa
2000	2100		China, China Radio Intl 5965eu	9440af	9840eu	2100	2145	USA, WYFR Okeechobee FL	7580eu	13820af	15565af	17575sa	
2000	2100		Costa Rica, R for Peace Intl	15040va	21815usb	2100	2145	21252af					
2000	2100		Costa Rica, University Network	5030am	6150am	2100	2156	North Korea, VO Korea	7505va	11335va			
			11870am	13749na	17645as	2100	2157	Czech Rep, Radio Prague Intl	5930va	9430va			
2000	2100		Ecuador, HCJB	11890eu		2100	2159	Canada, Radio Canada Intl	11600va	13650va			
2000	2100	mtwhf	Eqt Guinea, Radio Africa	15185af		2100	2200	Anguilla, Caribbean Beacon		11775am			
2000	2100	a/monthly	Finland, Scandy Weekend Radio	6170va	11690va	2100	2200	Australia, Christian Voice	7170pa				
2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do	2100	2200	Austria, AWR Europe	9660af				
2000	2100		Guyana, Voice of	5950do		2100	2200	Botswana, Radio	3356do	4820do			
2000	2100		Indonesia, Voice of	9525pa		2100	2200	Cameroon, RTV	4850do	6005do			
2000	2100	vl	Italy, IRRS	3980al	3985va	2100	2200	Canada, CBC Northern Service	9625do				
2000	2100		Kenya, Kenya BC Corp	4885irr	4915irr	2100	2200	Canada, CFRX Toronto ON	6070do				
2000	2100		Kuwait, Radio	11990va		2100	2200	Canada, CFVP Calgary AB	6030do				
2000	2100	vl	Lesotho, Radio	4800do		2100	2200	Canada, CHNX Halifax, NS	6130do				
2000	2100		Liberia, ELWA	4760do		2100	2200	Canada, CKZN St John's NF	6160do				
2000	2100		Liberia, R Liberia Intl	5100do		2100	2200	Canada, CKZU Vancouver BC	6160do				
2000	2100	mtwha	Malta, VO Mediterranean	7440eu		2100	2200	China, China Radio Intl 5965eu	9840eu				
2000	2100		Namibia, NBC	3270af	3290af	2100	2200	Costa Rica, R for Peace Intl	15040va	21815usb			
2000	2100		New Zealand, Radio NZ Intl	15160pa		2100	2200	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
2000	2100	vl	Nigeria, Radio/Enugu	6025do		2100	2200	11870am	13749na	17645as			
2000	2100	vl	Nigeria, Radio/Ibadan	6050do		2100	2200	Ecuador, HCJB	11890eu				
2000	2100	vl	Nigeria, Radio/Kaduna	4770do	6090do	2100	2200	Egypt, Radio Cairo	15375af				
2000	2100	vl	Nigeria, Radio/Lagos	3326do	4990do	2100	2200	Eqt Guinea, Radio Africa	15185af				
2000	2100		Nigeria, Voice of	7255af	11770af	2100	2200	Finland, Scandy Weekend Radio	6170va	11720va			
2000	2100	vl	Papua New Guinea, NBC	4890do		2100	2200	Ghana, Ghana BC Corp	3366do	4915do			
2000	2100		Russia, University Network	17765as		2100	2200	Guyana, Voice of	5950do				
2000	2100		Russia, Voice of Russia	5940eu	5950eu	2100	2200	India, All India Radio	7150va	7410eu	9650au	9910au	11620eu
2000	2100		Russia, World Beacon	3230af	17850af	2100	2200	11715au					
2000	2100		S Africa, African Beacon	3230af		2100	2200	Italy, IRRS	3980al	3985va			
2000	2100	vl	Solomon Islands, SIBC	5020do		2100	2200	Japan, Radio	6115eu	6180eu	11850as	11855af	11920as
2000	2100	mtwhf	Spain, R Exterior Espana	9595af	9680eu	2100	2200	17825pa	21670pa				
2000	2100		Uganda, Radio	5026do	7196do	2100	2200	Lesotho, Radio	4800do				
2000	2100		UK, BBC World Service	3255af	6005af	2100	2200	Liberia, ELWA	4760do				
2000	2100		UK, BBC World Service	9630af	11835af	2100	2200	Liberia, R Liberia Intl	5100do				
2000	2100		UK, World Beacon	3230af	17850af	2100	2200	Namibia, NBC	3270af	3290af	7215irr	15160pa	
2000	2100		USA, Armed Forces Radio	6458usb	12689usb	2100	2200	New Zealand, Radio NZ Intl					
2000	2100		USA, KAU Dallas TX	13815va		2100	2200	Nigeria, Radio/Enugu	6025do	6090do	7275do	9570do	
2000	2100		USA, KJES Vado NM	15385na		2100	2200	Nigeria, Radio/Ibadan	6050do				
2000	2100		USA, KTN Salt Lk City UT	15590na		2100	2200	15170af	15120va	15170pa			
2000	2100		USA, KWHR Naalehu HI	9930as		2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WBCQ Monticello ME	9335na	17495na	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WEWN Birmingham AL	11530na	13615na	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WHRA Greenbush ME	17650af		2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WHRI Noblesville IN	5745va	9495am	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WINB Red Lion PA	13570am		2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WJCR Upton KY	13590am	13595as	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WMLK Bethel PA	15265eu		2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WRMI Miami FL	15725am		2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WRNO New Orleans LA	7395am	15420am	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WTJC Newport NC	9370na		2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WWCR Nashville TN	9475na	12160na	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WWFV McCaysville GA	9400va	12172va	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WYFR Okeechobee FL	7580eu	13820af	2100	2200	15170pa	15120va	15170pa			
2000	2100		Vanuatu, Radio	17575sa		2100	2200	15170pa	15120va	15170pa			
2000	2100	vl	Zambia, Christian Voice	4956do	4960do	2100	2200	15170pa	15120va	15170pa			
2000	2100	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do	2100	2200	15170pa	15120va	15170pa			
2000	2100		USA, WSHB Cyp Creek SC	11550eu	15665af	2100	2200	15170pa	15120va	15170pa			
2005	2100	vl	Syria, Radio Damascus	12085eu	13610eu	2100	2200	15170pa	15120va	15170pa			
2025	2045		Italy, RAI Intl 7220af	9710af	11880af	2100	2200	15170pa	15120va	15170pa			
2030	2045		Libya, Voice of Africa	15435irr	17725af	2100	2200	15170pa	15120va	15170pa			
2030	2045		Thailand, Radio	9535eu	9655eu	2100	2200	15170pa	15120va	15170pa			
2030	2055		Belgium, RVI Flanders R Intl	9925eu		2100	2200	15170pa	15120va	15170pa			
2030	2057		Vietnam, Voice of	7145eu	9730eu	2100	2200	15170pa	15120va	15170pa			
2030	2100		Austria, AWR Europe	5955eu		2100	2200	15170pa	15120va	15170pa			
2030	2100		Austria, Christian Voice	7170as	9795as	2100	2200	15170pa	15120va	15170pa			
2030	2100	t h	Belarus, Radio Belarus Intl	7105eu	7210eu	2100	2200	15170pa	15120va	15170pa			
2030	2100		Cuba, Radio Havana	13660usb	13750eu	2100	2200	15170pa	15120va	15170pa			
2030	2100		Egypt, Radio Cairo	15375af		2100	2200	15170pa	15120va	15170pa			
2030	2100		Poland, Radio Polonia	5995eu	7165eu	2100	2200	15170pa	15120va	15170pa			
2030	2100		S Africa, AWR Africa	15295af		2100	2200	15170pa	15120va	15170pa			
2030	2100		Sweden, Radio	6065va	9445va	2100	2200	15170pa	15120va	15170pa			
2030	2100		USA, Voice of America	6035af	6095as	2100	2200	15170pa	15120va	15170pa			
2030	2100		11975af	13710af	15240af	2100	2200	15170pa	15120va	15170pa			
2030	2100		USA, Voice of America	4950af		2100	2200	15170pa	15120va	15170pa			
2030	2100		Uzbekistan, Radio Tashkent	5025eu	7105eu	2100	2200	15170pa	15120va	15170pa			
2030	2130		Australia, Christian Voice Intl	11935pa		2100	2200	15170pa	15120va	15170pa			
2040	2100	mtwhfa	Armenia, Voice of	4810eu	9960eu	2100	2200	15170pa	15120va	15170pa			
2045	2100		India, All India Radio	7150va	7410eu	2100	2200	15170pa	15120va	15170pa			
2050	2100		11715au			2100	2200	15170pa	15120va	15170pa			
2050	2100		Vatican City, Vatican Radio	4005eu	5885eu	2100	2200	15170pa	15120va	15170pa			

2100 UTC - 4PM E / 3PM C / 1PM P

2100	2110	Kenya, Kenya BC Corp	4885irr	4915irr		
2100	2110	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	
2100	2129	Poland, Radio Polonia	5995eu	7165eu	7290eu	9540eu
2100	2130	vl	Australia, ABC/Alice Springs	2310do		
2100	2130	vl	Australia, ABC/Katherine	2485do		
2100	2130	vl	Australia, ABC/Tennant Creek	2325do		
2100	2130		Australia, Christian Voice Intl	11935pa		

2130	2200	Australia, Radio	7240pa	960pa	1155as	1169as	1160vda
		1208pa	15415va	17715va	21740va		
2130	2200	Austria, Christian Voice	7170as				
2130	2200	th					
2130	2200	Belarus, Radio Belarus Intl		7105eu	7210eu		
2130	2200	Guam, KSDA/ AWR	11960as	11980as			
2130	2200	Iran, VO Islamic Rep. of Iran		9780va	11740va		
2130	2200	Turkey, Voice of	9525as				
2130	2200	f	UK, Wales Radio Intl	6010eu			

Shortwave Guide



2130 2200 Uzbekistan, Radio Tashkent 5025eu 7105eu 11905eu
2145 2200 USA, WYFR Okeechobee FL 7580eu 15565af

2200 UTC - 5PM E / 4PM C / 2PM P

2200 2205 vl Syria, Radio Damascus 12085eu 13610eu
2200 2215 New Zealand, Radio NZ Intl 15160pa
2200 2218 s Greece, Voice of 9420pa 15650pa
2200 2227 Iran, VO Islamic Rep. of Iran 9780va 11740va
2200 2230 Canada, Radio Canada Intl 6045va 9770va 9805va 11600va
2200 2230 India, All India Radio 7150va 7410eu 9650au 9910au 11620eu
11715au
2200 2230 Mexico, Radio Mexico Intl 9705am 11770am
2200 2230 vl Papua New Guinea, NBC 4890do
2200 2230 South Korea, R Korea Intl 3955eu
2200 2230 Turkey, Voice of 9525as
USA, KWHR Naalehu HI 9930as
2200 2230 USA, Voice of America 6035af 7415af 11655af 11975af 13710af
2200 2230 Yugoslavia, Radio 6100eu
2200 2245 Egypt, Radio Cairo 9990eu
2200 2245 USA, WYFR Okeechobee FL 7580eu 11740na 15565af
2200 2259 as Spain, R Exterior Espana 9595va 9680eu
2200 2300 Anguilla, Caribbean Beacon 6090am
2200 2300 Australia, ABC/Alice Springs 4835do
2200 2300 vl Australia, ABC/Katherine 5025do
2200 2300 Australia, ABC/Tennant Creek 4910do
2200 2300 Australia, Christian Voice Intl 13620pa 17850pa
2200 2300 Australia, Radio 11550as 11695as 15240as 15415pa 17715va
17795va 21740va
2200 2300 Austria, Christian Voice 13620as 17850as
2200 2300 Bulgaria, Radio 5800eu 7500eu
2200 2300 vl Cameroon, RTV 4850do 6005do
2200 2300 Canada, CBC Northern Service 9625do
2200 2300 Canada, CFXR Toronto ON 6070do
2200 2300 Canada, CFVP Calgary AB 6030do
2200 2300 Canada, CHNX Halifax, NS 6130do
2200 2300 Canada, CKZN St John's NF 6160do
2200 2300 Canada, CKZU Vancouver BC 6160do
2200 2300 China, China Radio Intl 5990na 13680na
2200 2300 Costa Rica, R for Peace Intl 15040va 21815usb
2200 2300 Costa Rica, University Network 5030am 6150am 7375am 9724sa
11870am 13749na 17645as
2200 2300 mtwhf Eqt Guinea, Radio Africa 15185af
2200 2300 f/monthly Finland, Scandv Weekend Radio 6170va 11720va
2200 2300 vl Ghana, Ghana BC Corp 3366do 4915do
2200 2300 Guyana, Voice of 3290do 5950do
2200 2300 Italy, IRRS 3980al 3985va
2200 2300 Malaysia, Radio 7295do
2200 2300 Namibia, NBC 3270af 3290af 7215irr
2200 2300 Nigeria, Radio/Enugu 6025do
2200 2300 Nigeria, Radio/Ibadan 6050do
2200 2300 Nigeria, Radio/Kaduna 4770do 6090do 7275do 9570do
2200 2300 Nigeria, Radio/Lagos 3326do 4990do
2200 2300 Nigeria, Voice of 7255af 11770af 15120va
2200 2300 Russia, University Network 17765as
2200 2300 Solomon Islands, SIBC 5020do 9545do
2200 2300 Taiwan, R Taipei Intl 5810eu 9335eu
2200 2300 UK, BBC World Service 5965as 5975as 6195va 7105as 9660as
11685as 11835af 12080pa 15400af
2200 2300 Ukraine, R Ukraine Intl 5905eu 7240eu 9560eu
2200 2300 USA, Armed Forces Radio 6458usb 12689usb
2200 2300 USA, KAL Dallas TX 13815va
2200 2300 USA, Voice of America 6160as 7215as 7290me 9530me 9770me
9880as 9890as 11760as 15185as 17820as
2200 2300 vl USA, WBCQ Monticello ME 7415na 9335na 17495na
2200 2300 USA, WEWN Birmingham AL 9975eu 11530na 15745na 17595eu
2200 2300 USA, WHRA Greenbush ME 17650af
2200 2300 USA, WHRI Noblesville IN 5745va 9495am
2200 2300 USA, WINB Red Lion PA 13570am
2200 2300 USA, WJCR Upton KY 7490am 13595as
2200 2300 USA, WRMI Miami FL 15725am
2200 2300 USA, WRNO New Orleans LA 7395am
2200 2300 USA, WSHB Cyp Creek SC 7510va 15285sa
2200 2300 USA, WTJC Newport NC 9370na
2200 2300 USA, WWFB McCaysville GA 9400va 12172va
2200 2300 Vanuatu, Radio 3945do 4960do 7260do
2200 2300 Zambia, Christian Voice 4965do
2200 2359 Liberia, R Liberia Intl 5100do
2205 2230 Italy, RAI Int'l 9675as 11900as
2216 2300 New Zealand, Radio NZ Intl 17675pa
2220 2255 Belgium, RVI Flanders R Intl 13700na
2220 2257 Czech Rep, Radio Prague Intl 7345na 9435af
2220 2300 smtwhf Austria, Radio Austria Intl 5945eu 6155eu
2230 2300 Cuba, Radio Havana 9550am
2230 2300 mtwhf Hungary, Radio Budapest 3975eu 7135eu
2230 2300 vl Papua New Guinea, NBC 4890do 11880irr
2230 2300 Sweden, Radio 6065va 7325va
2230 2300 India, All India Radio 9705as 9950as 13605as

2245 2300 USA, WYFR Okeechobee FL 11740na

2300 UTC - 6PM E / 5PM C / 3PM P

2300 0000 Anguilla, Caribbean Beacon 6090am
2300 0000 vl Australia, ABC/Alice Springs 4835do
2300 0000 vl Australia, ABC/Katherine 5025do
2300 0000 vl Australia, ABC/Tennant Creek 4910do
2300 0000 vl Cameroon, RTV 4850do 6005do
2300 0000 Canada, CBC Northern Service 9625do
2300 0000 Canada, CFRX Toronto ON 6070do
2300 0000 Canada, CFVP Calgary AB 6030do
2300 0000 Canada, CHNX Halifax, NS 6130do
2300 0000 Canada, CKZN St John's NF 6160do
2300 0000 Canada, CKZU Vancouver BC 6160do
2300 0000 China, China Radio Intl 5990na 13680na
2300 0000 Costa Rica, R for Peace Intl 15040va 21815usb
2300 0000 Costa Rica, University Network 5030am 6150am 7375am 9925sa
11870am 13749na 17645as
2300 0000 Ecuador, HCJB 11785as
2300 0000 Egypt, Radio Cairo 9900na
2300 0000 f/monthly Finland, Scandv Weekend Radio 6170va 11690va
2300 0000 vl Ghana, Ghana BC Corp 3366do 4915do
2300 0000 Guyana, Voice of 3290do 5950do
2300 0000 India, All India Radio 9705as 9950as 13605as
2300 0000 Italy, IRRS 7120va 7125al
2300 0000 Liberia, R Liberia Intl 5100do
2300 0000 Malaysia, Radio 7295do
2300 0000 Malaysia, RTM Kota Kinabalu 5980do
2300 0000 Namibia, NBC 3270af 3290af 7215irr
2300 0000 New Zealand, Radio NZ Intl 17675pa
2300 0000 vl Papua New Guinea, NBC 4890do 11880irr
2300 0000 Romania, R Romania Intl 7195eu 9510na 9570eu 11940na
2300 0000 Russia, University Network 17765as
2300 0000 Singapore, SBC Radio One 6150do
2300 0000 Solomon Islands, SIBC 5020do 9545do
2300 0000 UK, BBC World Service 3915as 5875eu 5965as 5975am 6035as
7105as 11685as 11945as 12095sa 15280as
2300 0000 USA, Armed Forces Radio 6458usb 12689usb
2300 0000 USA, KAL Dallas TX 13815va
2300 0000 USA, KTBN Salt Lk City UT 15590na
2300 0000 USA, Voice of America 6160as 7215as 7290me 9530me 9770me
9880as 9890as 11760as 15185as 17820as
2300 0000 as USA, WBCQ Monticello ME 7415na 9335na 17495na
2300 0000 USA, WEWN Birmingham AL 9355na 9975eu 11530na 17595eu
2300 0000 USA, WHRA Greenbush ME 7580eu
2300 0000 USA, WHRI Noblesville IN 5745va 9495am
2300 0000 USA, WINB Red Lion PA 12160am
2300 0000 USA, WJCR Upton KY 7490am 13595as
2300 0000 USA, WRMI Miami FL 15725am
2300 0000 USA, WRNO New Orleans LA 7355am
2300 0000 USA, WSHB Cyp Creek SC 7510va 15285sa
2300 0000 USA, WTJC Newport NC 9370na
2300 0000 USA, WWBS Macon GA 11900na
2300 0000 USA, WWCR Nashville TN 3215na 5070na 7520na 13845na
2300 0000 USA, WWFV McCaysville GA 6890va 9400va
2300 0000 Vanuatu, Radio 3945do 4960do 7260do
2300 0000 Zambia, Christian Voice 4965do
2300 2305 Nigeria, Radio/Enugu 6025do
2300 2305 Nigeria, Radio/Ibadan 6050do
2300 2305 Nigeria, Radio/Kaduna 4770do 6090do 7275do 9570do
2300 2305 Nigeria, Radio/Lagos 3326do 4990do 9730as 11550as 11695as 12080pa
2300 2305 as Australia, Radio 9660pa 15240as 15415pa 17715va 17795va 21740va
2300 2305 Austria, Christian Voice 13620as 17850as
2300 2305 Canada, Radio Canada Intl 9755am 11865am 13730am
2300 2305 Cuba, Radio Havana 9550am
2300 2305 mtwhf Mexico, Radio Mexico Intl 9705am 11770am
2300 2305 USA, VOA Special English 6045as 7140as 9545as 11925as
15395as
2300 2345 Germany, Deutsche Welle 9470as 9815as 13690as 21790as
2300 2345 USA, WYFR Okeechobee FL 11740na 15170sa 15400sa
2300 2350 Turkey, Voice of 9655na 9830va
2300 2350 Albania, Radio Tirana Intl 7130eu 9540eu
2300 2350 Australia, Christian Voice Intl 11935pa 13620pa 17850pa
2300 2350 Australia, Radio 9660pa 11695as 12080pa 15135as 15240as
15415pa 17715va 17795va 21740va
2300 2350 Austria, Christian Voice 11935pa 13620as 17850as
2300 2350 Canada, Radio Canada Intl 5960am 6040am 6175am 9590am
9755am 11865am 13730am
2300 2350 Cuba, Radio Havana 9550am
2300 2350 Mexico, Radio Mexico Intl 9705am 11770am
2300 2350 USA, VOA Special English 6045as 7140as 9545as 11925as
15395as
2300 2350 Turkey, Voice of 9655na 9830va
2300 2350 Albania, Radio Tirana Intl 7130eu 9540eu
2300 2350 Australia, Christian Voice Intl 11935pa 13620pa 17850pa
2300 2350 Australia, Radio 9660pa 11695as 12080pa 15135as 15240as
15415pa 17715va 17795va 21740va
2300 2350 Austria, Christian Voice 11935pa 13620as 17850as
2300 2350 Canada, Radio Canada Intl 5960na 6175na 9590na 9755na
9845na 11805as 11925as 13745as 15205as 15395as
2300 2350 Libya, Voice of Africa 15435irr 17725af
2300 2350 Vietnam, Voice of 9840as 12019as
2300 2350 Lithuania, R Vilnius 9875na
2300 2350 Switzerland, Swiss R Intl 9885sa 11660sa

Check out the Monitoring Times website at
www.monitoringtimes.com

Notes:

1. **BBCWS stream abbreviations:** **(am)**=Americas; **(eu)**=Europe/N. Africa; **(me)**=Middle East, SW Asia, CIS (former Soviet Union); **(wcaf)**=West and Central Africa; **(esaf)**=East and Southern Africa; **(af)**=both (wcaf) and (esaf); **(sas)**=South Asia; **(eas)**=East Asia.

2. **New this month** in the program listings are frequencies that are most likely to be used in North America for hearing the various BBCWS program streams. The BBC gives no on-air indication as to which stream a listener is tuned; this additional listing here might reduce confusion for readers. As a general rule, the Asian streams will be better received in western North America and the other streams will be better received in eastern North America. More sophisticated equipment will have better success receiving these offshore streams. For a full listing of frequencies in use, refer to the frequency listing section of the SWG. Be advised also that there have been numerous reports of BBC frequencies being misprogrammed from time to time.

3. **Listings for the US-based independent commercial shortwave broadcasters** are limited to general interest programming that departs from their primary formats of religious and political fare.

0000 UTC/ 7pm E/4pm P - Page 43 Freqs

BBC World Service (am) - 5975, 9915, 12095

0000 M World Briefing, T-S News; **0001** S Play of the Week (drama); **0005** T-A Outlook (magazine); **0020** M Sports Roundup; **0030** S Arts in Action, M The World Today; **0045** T Patterns of Faith (religion), W Radio History of the World, H Heart & Soul (spiritual matters), F What's the Problem? (advice), A It's a Girl! (women in societies).

BBC World Service (eas) - 6195, 15280, 15360

0000 D World Briefing; **0020** D Sports Roundup; **0030** S Agenda (trends), M-A World Business Report; **0045** M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (sas) - 5965, 9410, 11955, 15310, 17790

0000 D World Briefing; **0020** D Sports Roundup; **0030** S Agenda (trends), M-F The World Today, A Science in Action.

Radio Australia

0000 D News; **0005** S The Europeans, A Feedback (letters/station news); **0110** M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); **0030** A Country Breakfast (rural life).

Radio Bulgaria

0000 D News; **0110** S Views Behind the News, M Folk Studio (Bulgarian folk music), T-A Events and Developments (current affairs review); **0020** T Sports; **0025** T-A Timeout for Music; **0030** A Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); **0035** T-S Keyword Bulgaria (Bulgaria and things Bulgarian), F Answering Your Letters, **0045** T Magazine Economy, W Arts and Artists, H History Club, F The Way We Live, A Radio Bulgaria Calling (for radio hobbyists).

Radio Canada International

0000 D CBC News; **0005** S Quirks & Quarks (science), M Global Village (world music), T-A As It Happens (interviews with newsmakers)[began at 2330]; **0030** H Dispatches (world events in Canadian perspective).

Radio Netherlands

0000 S/W Music 52-15 (international music), M Dutch Horizons, T Research File (science), H Documentary, T The Sound Fountain ("a torrent of ideas"), A A Good Life (global development); **0015** F From Sapphire to Laser (classical music); **0030** S Roughly Speaking (youth culture), M The Sound Fountain, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

Radio Japan

0000 D News; **0010** S Hello from Tokyo (listener contact), M Weekend Square; **0015** T-A 44 Minutes (feature magazine).

Radio New Zealand International

0000 D RNZ News; **0005** S Film Show, M-F Cadence (light classics), A Home Grown (NZ music, including Musical Chairs-artist feature 0030); **0030** S Bookmarks.

Radio for Peace International, Costa Rica

0000 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News (Pacifica Reporters Against Censorship daily newscast); **0030** S RFPI Mailbag, M One World—One Family

(Bohai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation" magazine), F This Way Out (lesbian/gay magazine); **0035** T/H/A Earthwatch (ecology), **0040** T/H/A Earth & Sky (astronomy); **0045** T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

Voice of America (News Now)

0000 T-A World News; **0010** T-A Regional News; **0014** T-A USA News; **0018** T-A Sports; **0022** T-A Features, **0030** T-A World News; **0033** T Encounter, W Our World, H Kaleidoscope, F Best of 'Talk to America' A Press Conference USA.

WBCQ, Maine

7415 kHz.: **0000** S The Real Amateur Radio Show, M Le Show (humor/entertainment), F Goddess Irena 1 Music Show, A The Lost Discs Radio Show; **0030** S Fred Flintstone Music Show, H World of Radio, F Steppin' Out of Babylon.

WWCR, Tennessee

5070 kHz.: **0000** M Into the Blue.

0100 UTC/ 8pm E/5pm P - Page 43 Freqs

BBC World Service (am) - 5975, 9525, 9915, 12095

0100 S/M The World Today, T-A News; **0105** T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); **0130** S Reporting Religion, T Music Mix, W UK Top 20, H/A Westway (drama serial), F World of Music; **0145** S Letter from America (Alistair Cooke comments), H UK Album Chart, A Music X-Press.

BBC World Service (eas) - 6195, 15280, 15360

0100 S The World Today, M-A News; **0105** M Talking Point (global phone-in), T-A Outlook (magazine); **0130** S In Praise of God (religious service); **0145** M-F Off the Shelf (readings), A Write On or From Where I Stand (British views).

BBC World Service (sas) - 5965, 9410, 11955, 15310, 17790

0100 D The World Today; **0130** S Assignment, A People and Politics.

China Radio International

0100 D News; **0110** S Report on Developing Countries, M-F Current Affairs, A Global Review, 0120 S In the Spotlight (cultural magazine), A Listeners' Garden; **0130** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0100 D News; **0105** S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); **0115** S Inside Europe, M Arts on the Air; **0130** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCIJ, Ecuador

0100 S DX Partyline, M Musical Mailbag, T-A Latin American & World News; **0110** T-A Studio 9 (Latin American regional report including T Inside HCIJ, W/F Did You Hear? (news comment), H Ham Radio Today, A Musica del Ecuador); **0130** S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; **0145** T-A Slice of Infinity.

Radio Australia

0100 D News; **0105** S Correspondents' Report, A Asia Pacific (regional current affairs); **0110** M-F Asia Pacific; **0130** S Oz Sounds (new music releases), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A Arts Talk.

[Special service: **0105** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0100 D International News; **0110** M Weekly Review, T-S National News; **0115** T-S Viewpoint; **0130** M Mailbag Show, T-S News Bulletin; **0135** T-A Time Out (sports); **0140** S/W DXers Unlimited, T/F Caribbean Outlook, H Mailbag Show, A Weekly Review.

Radio Netherlands

0100 S/M News, T-A Newsline; **0105** S Europe Unzipped, M Wide Angle (week in review).

Radio New Zealand International

0100 D RNZ News; **0105** S Eureka! (science)*, M-F In Touch with New Zealand (music/interviews/variety), A Home Grown (from 0006)*; **0130** S Health or Environment Matters.

[*may be preempted by live sport]

Radio for Peace International, Costa Rica

0100 S Making Contact, M Every Living Thing (nature), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F For Right Radio Review, A Continent of Media; **0130**

S Alternative Radio (political/social analysis), T Earthspan (War & Peace Foundation), W RFPI Mailbag, A World of Radio.

Radio Prague

0100 D News; **0105** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0110** S Saturday Music (classical/folk/jazz), M The Arts; **0115** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; **0120** W Talking Point, F Economic Report.

Radio Ukraine International

0100 D News; **0106** M Hello From Kiev (listener letters/music); **0010** T-S Ukraine Today (magazine); **0018** S Baroque (the arts); **0020** M Music from Ukraine; **0025** T-F Closeup (current issues).

Voice of America (News Now)

0100 T-A World News; **0110** T-A Regional News; **0114** T-A USA News; **0118** T-A Sports; **0122** T-A Features; **0130** T-A World News; **0133** A Communications World; **0136** T-F Dateline (news magazine); **0145** T-F Science; **0149** T-F Business; **0154** T-F Feature.

Voice of Vietnam

0100 D News; **0105** D Current Affairs; **0110** Su Weekly Review, M Sunday Show, T/W/F A Press Review, H Talk of the Week; **0115** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0120** S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: **0100** S A Different Kind of Oldies Show, M Radio New York International, F Everybody's Uncle, A Allan Weiner Worldwide.

WHRI, Indiana

5745 kHz.: **0100** S DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **0105** W-F Golden Age of Radio Theatre; **0130** S New Horizons (science); **0145** S Ask WWCR (letters).

Radio Austria International

0130 D Report from Austria (magazine); **0135** S Week in Review, M Radio E; **0150** S Listener Letters.

RTE, Ireland

0130 S/M Sportsnews; T-A The News at Six.

Voice of America (Special English)

0130 T-A News; **0140** T Agriculture Today, W/H Science Report, F Environment Report, A In the News; **0145** T Science in the News, W Explorations, H Making of a Nation, F American Mosaic, A American Stories.

0200 UTC/ 9pm E/6pm P - Page 43 Freqs

BBC World Service (am)(me) - 5975, 9410, 9525, 9915, 12095

0200 S The World Today, M-A News; **0205** M Wright Around the World (musical variety), T Health Matters, W Go Digital, H Sports International, F One Planet (ecology), A Discovery (science); **0230** S From Our Own Correspondent, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places, A Essential Guide.

BBC World Service (eas) - 15280, 15360

0200 S/A The World Today, M-F News; **0205** M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, F Meridian-Writing, F Omnibus (documentary); **0230** S From Our Own Correspondent, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Global Business; **0245** W UK Album Chart, F Music X-Press.

BBC World Service (sas) - 11955, 15310, 17790

0200 D The World Today; **0230** S From Our Own Correspondent, A Global Business.

HCIJ, Ecuador

0200 S Rock Solid, M Hour of Decision, T-A Insight for Living; **0228** T-A Money Minute; **0230** M Renewing Your Mind, T-A Back to the Bible; **0255** T-A Joni and Friends.

Radio Australia

0200 D News; **0205** S Margaret Throsby (interviews and music), A Background Briefing (documentary); **0210** M-F The World Today (ABC Radio flagship news program).

[Special service: **0205** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Budapest

0200 D News; **0210** S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Shortwave Guide



Radio Canada International

0200 D News; **0205** S Business Sense, M Maple Leaf Mailbag (w/CDX report bimonthly); **0210** T Canada Today (current events magazine); **0235** S/Canada in the World, M H Spotlight (arts & culture), T Media Zone (journalists discuss), W Maple Leaf Mailbag (w/CDX report bimonthly), F Business Sense.

Radio Habana Cuba

0200 D International News; **0210** M Top Tens (Cuban popular music), T-S Spotlight on the Americas; **0215** S World of Stamps, T-A Reports and music; **0230** M The Jazz Place, T-S News Bulletin; **0235** T-S Reports and music.

Radio Korea International

0200 D News; **0210** S Seoul Report (week in review), M Korean Pop Interactive (requests), T-A News Commentary; **0215** T-A Seoul Calling (magazine); **0230** S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Korea Today & Tomorrow, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

Radio New Zealand International

0200 D RNZ News; **0205** S/A Music feature or series, M-F In Touch with New Zealand (cont'd from 0105); **0235** S The Band Programme (brass band music).

Radio for Peace International, Costa Rica

0200 S Alternative Radio (from 0130), M New Dimensions ("progressive" ideas), T University Forum (interviews), W Confinet of Media, H WINGS (women's news), F RadioNation ("The Nation" magazine), A RFI Mailbag; **0230** S For Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W TUC Radio, H Global Community Forum (interviews), F A Woman's Voice, A Disability Radio Worldwide.

Radio Prague

0200 D News; **0205** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0210** S Saturday Music (classical/folk/jazz), M The Arts; **0215** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine, **0220** W Talking Point, F Economic Report.

Radio Romania International

0200 D Radio Newsfeed; **0210** S The Week, M Focus, T-A Commentary; **0215** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; **0220** S RRI Encyclopedia, T Political Flash, W European Horizons; **0225** S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; **0230** S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W W Mother Nature (ecology), H Visit Romania, A Practical Guide; **0235** S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; **0240** S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); **0245** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; **0250** M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

Radio Taipei International

0200 D News; **0215** S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Culture Express, W Taiwan Today, H Instant Noodles, F Taipei Magazine, A Groove Zone; **0230** S Mailbag Time, T Trends, W Confucius and Inspiration Beyond, H Life Unusual, F People; **0245** M-F Let's Learn Chinese (M/W elementary, T/H intermediate, W advanced), A Kaleidoscope (life in Taiwan).

[This schedule also airs at **0700** for western North America.]

Voice of Russia

0200 D News; **0211** S News & Views, M Sunday Panorama, T-A Commonwealth Update; **0224** M Russia: People & Events; **0230** D News in Brief; **0232** S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Yours for the Asking, A Christian Message from Moscow; **0146** F Music At Your Request; **0154** H Russia: People & Events.

WBQ, Maine

7415 kHz.: **0200** S Marion's Attic (vintage recordings), A Tasha Takes Control.

WWCR, Tennessee

5070 kHz.: **0230** S New Horizons (science); **0245** S Ask WWCR (letters).

Radio Sweden

0230 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0245** Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0230 D News; **0235** D Current Affairs; **0240** Su Weekly Review, M Sunday Show, T/W/F A Press Review, H Talk of the Week; **0245** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0250** S Music, A Literature and Arts.

0300 UTC/ 10pm E/7pm P - Page 44 Freqs

BBC World Service (am) - 5975, 9525

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Science in Action, M Assignment, T-A World Business Report; **0345** T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (me) - 6195, 9410, 12095, 15575

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Science in Action, M World Business Review, T-A World Business Report; **0345** M Write On or From Where I Stand (British views), T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (af) - 7160, 11730, 11765, 12035, 15420*

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Postmark Africa, M-F Network Africa, A African Quiz or This Week And Africa. (*from 0330)

BBC World Service (sas) - 15310, 17790, 21830

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Science in Action, M World Business Review, T-A World Business Report; **0345** M Letter from America (Alistair Cooke comments), T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (eas) - 15280, 15360*, 17760, 21660

0300 S World Briefing, M-A News; **0305** M One Planet (ecology), T Discovery (science), W Health Matters, H Go Digital, F Sports International, A Wright Around the World (music requests); **0320** S Sports Roundup; **0330** S Science in Action, M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best).

Channel Africa

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0300 D News; **0310** S Report on Developing Countries, M-F Current Affairs, A Global Review; **0320** S In the Spotlight (cultural magazine), A Listeners' Garden; **0330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0300 D News; **0305** S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); **0315** S Spectrum (sci/tech), M Arts on the Air; **0330** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0300 S Inspirational Classics (liturgical classical music), M The Sower, T-A Stories of Great Christians; **0315** M The Word Today, T-A Rendezvous (inspirational music); **0330** S Did You Hear (news comment), M Unshocked (radio's oldest drama series), T Let My People Think (apologetics), W Words for Women, H Adventures in Odyssey (children), F Book &

Hauser's Highlights

KOREA NORTH: VOK English:

0100-0200	NECHN	6195, 7140, 9345
0100-0200	CAm/SAm	6520, 7580, 11735
0200-0300	SEAs	9325, 11335
0300-0400	NECHN	6195, 7140, 9345
1000-1100	CAm/SAm	3560, 9335, 11710
1000-1100	SEAs	9850, 11735
1300-1400	WEu	4405, 7505, 11335
1300-1400	NAm	9335, 11710
1500-1600	WEu	4405, 7505, 11335
1500-1600	NAm	9335, 11710
1600-1700	ME/NAf	3560, 9975, 11735
1900-2000	WEu	4405, 7505, 11335
2100-2200	WEu	4405, 7505, 11335

(From: <http://www.246.ne.jp/~obi/sked-nk.htm> Asian Broadcasting Institute) includes feeders(?) 3560, 4405. So they broadcast 2 hpd of English to northeast China? (gh)

the Spade (religion & archaeology), A Walkin' in the Sunshine (country music), **0345** S Specialized English, W/Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

Radio Australia

0300 D News; **0305** S Feedback (letters/station news), A Rural Reporter; **0310** M-F Regional Sports Report; **0320** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0330** S Ockham's Razor (a science issue), A Educational series; **0340** M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blocktracker (contemporary Aboriginal music), H Australian Country Style, F Jazz Notes.

[Special service.] **0305** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Bulgaria

0300 D News; **0310** S Views Behind the News, M Folk Studio (Bulgarian folk music), T-A Events and Developments; **0320** T Sports; **0325** W-S Timeout for Music; **0330** T Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); **0335** T Answering Your Letters, W-M Keyword Bulgaria (Bulgaria and things Bulgarian); **0345** S Radio Bulgaria Calling (for radio hobbyists), W Magazine Economy, H Arts and Artists, F History Club, A The Way We Live.

Radio Habana Cuba

0300 D International News; **0310** M Breakthrough (science magazine), T-S National News; **0315** T-S Viewpoint; **0330** M From Havana (Cuban musicians), T-S News Bulletin; **0335** T-A Time Out (sports), **0340** S/W DXers Unlimited, T/F Caribbean Outlook, H Mailbag Show, A Weekly Review.

Radio New Zealand International

0300 S/A RNZ News*, M-F Pacific Regional News; **0305** S Playhouse* (drama for radio), A Tagata o te Moana (Pacific culture); **0308** M Tagata o te Moana, T Top 5, W Pacific Report, H Mailbox (letters & DX news) or RNZI Talk (meet the RNZI staff), F Dateline Pacific; **0330** T New Releases, W Tradewinds (Pacific commerce), H The World in Sport, F Pacific Correspondent. [*may be preempted by live sport].

Radio for Peace International, Costa Rica

0300 S Far Right Radio Review (from 0230), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 0230), W Living Enrichment Center, H Global Community Forum (from 0230), F A Woman's Voice (from 0230), A Earthspan (War & Peace Foundation); **0330** S Peace Forum, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newmaier Report; **0345** S/M Hightower Report (commentary), T-A UN Today; **0348** S/M Earthwatch (ecology); **0351** S/M Earth & Sky (astronomy); **0355** S/M World Opinion (on terrorism).

Radio Taipei International

0300 D News; **0315** S Great Wall Forum (discussing the mainland), M Taiwan Economic Journal, T Culture Express, W New Music Lounge, H Instant Noodles, F Weekend Zoo, A Kaleidoscope (life in Taiwan); **0330** S Asia Pacific, M People, T Trends, H Life Unusual, F Business Chinese, A Maibag Time; **0345** M-H Let's Learn Chinese (M/H elementary, T intermediate, W advanced), F Business Chinese.

Voice of Russia

0300 D News; **0311** S/M/H Moscow Mailbag, T/F Science & Engineering, W/A Newmarket (business); **0330** D News in Brief; **0332** S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); **0346** S You Write to Moscow, **0354** W Russia: People & Events.

WHRI, Indiana

17510 kHz.: **0300** DXing with Cumbre.

WWCR, Tennessee

3215 kHz.: **0300** A World of Radio.

5070 kHz.: **0300** S Communications World, **0330** S World of Radio.

Radio Budapest

0330 D News; **0340** S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Sweden

0330 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0345** T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0330 D News; **0345** D Current Affairs; **0340** Su Weekly Review, M Sunday Show, T/W/F A Press Review, H Talk of the Week; **0345** T Vietnam: Land & People, W Culture &

Shortwave Guide



Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0350** S Music, A Literature and Arts.

0400 UTC/ 11pm E/8pm P - Page 44 Freqs

BBC World Service (am)(eu) - 5975, 6135, 6195, 9410

0400 S/M The World Today, T-A News; **0405** T Just a Minute (panel game), W The Alternative (music), H Greenfield Collection (classical music), F Jazzmatazz, A Composer of the Month; **0430** S Global Business, M Westway Omnibus (drama serial), T It's a Girl! (women in societies), W Patterns of Faith (religion), H Radio History of the World, F Heart & Soul (spiritual matters), A Write On (letters) or From Where I Stand (British views); **0445** T-A Off the Shelf (book readings).

BBC World Service (me) - 12095, 15575

0400 D The World Today; **0430** S In Praise of God, A Assignment; **0450** M-F Sports Roundup.

BBC World Service (af) - 6005, 7160, 11765, 15420

0400 D The World Today; **0430** S African Perspective, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas) - 15310, 17790, 21830

0400 S The World Today, M-A News; **0405** M Talking Point, T-A Outlook; **0420** S Sports Roundup; **0430** S Science in Action; **0445** M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (eas) - 15280, 17760, 21660

0400 D The World Today; **0430** S Just a Minute (panel game), A Assignment; **0450** M-F Sports Roundup.

Channel Africa

0400 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0400 D News; **0410** S Report on Developing Countries, M-F Current Affairs, A Global Review; **0420** S In the Spotlight (cultural magazine), A Listeners' Garden; **0430** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

0400 S DX Partyline, M Musical Mailbag, T-A Latin American & World News; **0410** T-A Studio 9 (Latin American regional report including T Inside HCJB, W/F Did You Hear? (news comment), H Ham Radio Today, A Musica del Ecuador); **0430** S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; **0445** T-A A Slice of Infinity.

Radio Australia

0400 D News; **0405** S/A Pacific Focus (S arts, A environment); **0410** M-F Margaret Throsby (interviews and music); **0430** S Arts Talk, A The Buzz (technology issues).

Special service: **0405** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Havana Cuba

0400 D International News; **0410** M Weekly Review, T-S Spotlight on the Americas; **0415** S World of Stamps, T-A Reports and music; **0430** M Mailbag Show, T-S News Bulletin; **0435** T-S Reports and music; **0450** M Cuban music.

Radio Netherlands

0430 S/M News; T-A Newsline; **0435** S Europe Unzipped, M Sincerely Yours (letters); **0455** S Insight (commentary), M The Week Ahead (program previews).

Radio New Zealand International

0400 S/A RNZ News, M-F Checkpoint (major RNZ evening news magazine); **0410** S Religion feature or series, A Best of Kim Hill (top interviews of the week).

Radio for Peace International, Costa Rica

0400 S CounterSpin (media analysis), M Music Medicine, T-A Democracy Now! in Exile; **0430** S Freespeech Radio News (repeat of Fri. newscast).

Radio Prague

0400 D News; **0405** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0410** S Saturday Music (classical/folk/jazz), M The Arts; **0415** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; **0420** W Talking Point, F Economic Report.

Radio Romania International

0400 D Radio Newsreel; **0410** S The Week, M Focus, T-A Commentary; **0415** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; **0420** S RRI Encyclopedia, T Political Flash, W European

Horizons; **0425** S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; **0430** S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W Mother Nature (ecology), H Visit Romania, A Practical Guide; **0435** S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; **0440** S, Bucharest Along the Centuries, T Pages of Romanian literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (of the people); **0445** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; **0450** M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

Radio Ukraine International

0400 D News; **0406** M Hello From Kiev (listener letters/music); **0410** T-S Ukraine Today (magazine); **0418** S Baroque (the arts); **0420** M Music from Ukraine; **0425** T-F Closeup (current issues).

Radio Vlaanderen International

0400 S Music from Flanders, M Radio World, T-A News; **0404** T-A Belgium Today; **0408** M Tourism in Flanders, T-A Press Review; **0413** T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; **0414** M Brussels 1043 (letters); **0418** T Sports, H Around Town, F International Report, A Tourism in Flanders; **0424** M-A Soundbox (Flemish rock).

Voice of Russia

0400 D News; **0411** M Sunday Panorama, T-S News & Views; **0424** M Russia: People & Events; **0430** D News in Brief; **0432** S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century, W/F Russian history/culture.

WBCQ, Maine

7415 kHz.: **0400** S The Big Kaboom.

WHRI, Indiana

7315 kHz.: **0430** M DXing with Cumbre.

WWCR Tennessee

5070 kHz.: **0400** S Spectrum (communications discussion); **0430** M The Old Record Shop (vinylite recordings).

3215 kHz.: **0405** M Bible's Greatest Heroes; **0445** S Money Matters.

0500 UTC/ 12am E/9pm P - Page 45 Freqs

BBC World Service (am) - 6195, 9410

0500 S News, M-A The World Today; **0505** S Wright Around the World (music requests); **0530** A Arts in Action.

BBC World Service (eu) - 6195, 9410

0500 D The World Today; **0530** S Reporting Religion, A Network Europe; **0545** S Letter from America (Alistair Cooke comments).

BBC World Service (me) - 11760

0500 D The World Today; **0530** S Global Business, A Arts in Action.

BBC World Service (esaf) - 15420, 17885

0500 D The World Today; **0530** S Artbeat, M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (wcaf) - 7160, 11765

0500 D The World Today; **0530** S Artbeat, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas) - 15310, 17790

0500 S The World Today, M-A News; **0505** M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian Writing, F Omnibus (documentary), A Wright Around the World (music requests); **0530** S Reporting Religion, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; **0545** S Letter from America (Alistair Cooke comments), W UK Album Chart, F Music X-Press.

BBC World Service (eas) - 11955, 15360, 17760, 21660

0500 D The World Today; **0530** S Reporting Religion, M It's a Girl! (women in societies), T Patterns of Faith, W Radio History of the World, H Heart and Soul (spiritual matters), F What's the Problem? (advice), A Arts in Action; **0545** S Letter from America (Alistair Cooke comments), M-F Off the Shelf (readings).

Channel Africa

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0500 D News; **0510** S Report on Developing Countries, M-F Current Affairs, A Global Review; **0520** S In the Spotlight (cultural magazine), A Listeners' Garden; **0530** M People in

the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0500 D News; **0505** S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); **0515** S Marks & Markets, M COOL! (youth magazine); **0530** T Insight (international affairs), M Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0500 S Inspirational Classics (liturgical classical music), M Renewing Your Mind, T-S Family Life Today; **0530** S Did You Hear (news comment), M Unshackled (oldest drama on radio), T Let My People Think (apologetics), W/W Words for Women, H Adventures in Odyssey (children), F The Book & the Spade (religion and archaeology), A Walkin' in the Sunshine (country music); **0545** S Specialized English, W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

Radio Australia

0500 D News; **0505** S/A Pacific Focus (S business, A sport); **0510** M-F Pacific Beat (Pacific islands magazine with regional sports report @ 0530); **0530** S Fine Music Australia (classical), A Lingua Franca (about language); **0545** A Business Weekend.

Special service: **0505** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0500 D International News; **0510** M Top Tens (Cuban popular music), T-S National News; **0515** T Viewpoint; **0530** M The Jazz Place, T-S News Bulletin; **0535** T-A Time Out (sports); **0540** S/W DXers Unlimited, T/F Caribbean Outlook, H Mailbag Show, A Weekly Review.

Radio Japan

0500 D News; **0510** S Pop Goes Asia, A Hello from Tokyo (listener contact); **0515** M-F 44 Minutes (feature magazine).

Radio Netherlands

0500 S Roughly Speaking (European youth culture), M Dutch Horizons, T Research File (science), W/Music 52-15 (international music), H Documentary, F The Sound Fountain ("a torrent of ideas"), A Good Life (global development).

Radio New Zealand International

0500 D RNZ News; **0507** S Whenua (Maori magazine), M-F What's Going On? (arts & entertainment calendar), A Focus on Politics; **0525** A In a Mellow Tone (jazz); **0530** M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report; **0645** M-F Storytime.

Radio for Peace International, Costa Rica

0500 S/TUC Radio, M Neuhauser Report, T-A Democracy Now! in Exile (cont'd from 0400); **0515** M Living Enrichment Center; **0530** S Continent of Media.

Voice of Nigeria

0500 S Reflections, M-F Wave Train (music), A African Safari (music), **0505** S Link-Up (music requests); **0530** S/A News, M-F VON Scope (news magazine).

Voice of Russia

0500 News; **0511** S/M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); **0530** D News in Brief; **0532** S/A Timelines, M Jazz Show, T/Yours for the Asking, W/Moscow Yesterday and Today, H Folk Box, F Audio Book Club (Russian lit.); **0547** T Music At Your Request.

WBCQ, Maine

7415 kHz.: **0500** S Tom & Darryl (electronic media), M-A Amos 'n Andy.

WHRI, Indiana

7580 kHz.: **0530** A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **0500** S Cyber Line; **0530** M New Horizons (science/technology); **0545** M Ask WWCR (letters).

0600 UTC/ 1am E/10pm P - Page 45 Freqs

BBC World Service (eu)(me) - 6195, 9410, 11760, 12095, 15575

0600 D The World Today; **0630** S Agenda (trends), A People and Politics.

BBC World Service (esaf) - 6190, 11940, 17640

0600 S Word Briefing, M-A News; **0605** M Talking Point, T-A Outlook; **0620** S Sports Roundup; **0630** S Agenda (trends); **0645** M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

Shortwave Guide



BBC World Service (wcaf) - 6005, 7160, 11765

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (eas) - 11955, 15360, 21660

0600 S/A The World Today, M-F News; 0605 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 0630 S Westway Omnibus, M Composer of the Month, T Music Mix, W UK Top 20, H Just a Minute (panel game), F World of Music, A People and Politics.

BBC World Service (sas) - 15310, 17790

0600 S/A The World Today, M-F News; 0605 M Omnibus (documentary), T Discovery (science), W Health Matters, H Go Digital, F Sports International; 0630 S Westway Omnibus, M People and Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best), A People and Politics.

Channel Africa

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

Radio Australia

0600 D News; 0605 S The Europeans, A Feedback (letters/station news); 0610 M-F Regional Sports Report; 0620 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0630 A Oz Sounds (new releases); 0640 M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal music), H Australian Country Style, F Jazz Notes.

[Special service: 0605 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0600 D International News; 0610 M Breakthrough (science), T-S Spotlight on the Americas; 0615 S World of Stamps, T-A Reports and music; 0630 M From Havana (Cuban musicians), T-S News Bulletin; 0635 T-S Reports and music.

Radio Japan

0600 D News; 0610 S Weekend Square (Japanese life), A Pop Goes Asia; 0615 M-F Asian Top News (headlines from region's radio); 0625 M Unforgettable Musical Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio New Zealand International

0600 D RNZ News; 0605 S Future Indicative (magazine for disabled), M Eureka (science), T Best of John Campbell (from weekend morning program), W Musical Chairs (artist feature), H Bookmarks, F Country Life, A Saturday Night (variety); 0630 M Health or Environment Matters, H Feature, F Dateline Pacific; 0635 S This Week in Parliament.

Radio for Peace International, Costa Rica

0600 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News (Pacifica Reporters Against Censorship daily newscast); 0630 S RPFI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation" magazine), F This Way Out (lesbian/gay magazine); 0635 T/H/A Earthwatch (ecology); 0640 T/H/A Earth & Sky (astronomy); 0645 T Tropical Conservation News Bureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

Voice of Nigeria

0600 S This Week on VON, M Across the Ages, T Agenda for Peace, W Nigerian Newsletter, H West African Scene, F African Writers, A From the Racks; 0615 S Listeners' Letters, M Nigeria & Politics, T Nigerian Scene, W Wheel of Progress, H World of the Arts, F Images of Nigeria, A Issues of the Moment; 0630 S/A Weekly Analysis, M-F World News; 0640 M-F Commentary & Press Review; 0645 M-F News about Nigeria.

WBCQ, Maine

7415 kHz.: 0600 S Tom and Darryl (electronic media-1st/3rd wk), H World of Radio.

WHRI, Indiana

5745 kHz.: 0600 A DXing with Cumbre. 7315 kHz.: 0600 A DXing with Cumbre.

WWCR, Tennessee

3210 kHz.: 0600 M World of Radio; 0605 A Rock the Universe (Christian rock music); 0630 M Communications World. 5070 kHz.: 0600 S Keen on Jazz, T Ask WWCR (letters).

1000 UTC/ 5am E/2am P - Page 47 Freqs

BBC World Service (am) - 6195

1000 S/A World Briefing, M-F World Update; 1020 S/A Sports Roundup; 1030 S Agenda (trends), A Science in Action.

BBC World Service (eu) - 12095, 15485

1000 S/A World Briefing, M-F News; 1005 M One Planet (ecology), T Discovery (science), W Health Matters, H Go Digital, F Sports International, 1020 S/A Sports Roundup; 1030 S Arts in Action, M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best), A Science in Action.

BBC World Service (me) - 11760, 15575, 17640

1000 S/A World Briefing, M-F News; 1020 S/A Sports Roundup; 1030 S Agenda (trends), M-F World Learning (instructional series), A Science in Action.

BBC World Service (eas) - 6195, 9740, 15360

1000 S/A News, M-F World Update; 1001 S Concert Hall; 1005 A Jazzmatazz; 1030 M-F World Business Report, A Greenfield Collection (classical music); 1045 M-F Sports Roundup.

Radio Australia

1000 D News; 1005 S The Buzz (technology issues), M-F Asia Pacific (regional current affairs), A Pacific Review; 1030 S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A In Conversation.

R. New Zealand International

1000 D RNZ News; 1005 S Sportsword, M-H Kim Hill (interviews), F Sports Story, A The World in Sport; 1030 F Top 5 (music), A NZ News; 1045 A Dateline Pacific.

Radio for Peace International, Costa Rica

1000 S CounterSpin (media analysis), M Music Medicine, T-A Democracy Now! in Exile; 1030 S Freespeech Radio News (repeat of Fri. newscast).

Voice of America (News Now)

1000 D World News; 1010 D Regional News; 1014 D USA News; 1018 D Sports; 1022 D Features; 1030 D World News; 1033 S On the Line (US foreign policy), A Best of Talk to America; 1045 M-F Science, Medicine, Environment; 1049 M-F Business and Economic Report; 1053 M-F Music feature.

WWCR, Tennessee

9475 kHz.: 1030 W Communications World, F World of Radio; 1045 M Eco Watch, T Ask WWCR (letters).

5070 kHz.: 1000 A Big Backyard (Australian country music).

1100 UTC/ 6am E/3am P - Page 48 Freqs

BBC World Service (am) - 6195, 15190

1200 D News; 1205 M-F Caribbean Business; 1210 M-F Caribbean Morning Report; 1215 M-F NewsHour (cont'd.).

BBC World Service (eu)(wcaf) - 12095, 15485, 17830

1200 D NewsHour.

BBC World Service (me) - 15565, 15575, 17640

1200 D News; 1205 S The Alternative (music), M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Wright Around the World (music requests); 1230 S Global Business, M Composer of the Month, T Music Mix, W UK Top 20, H Just a Minute (panel game), F World of Music.

BBC World Service (esof) - 21740

1200 S/A NewsHour, M-F News; 1205 M-F Outlook (magazine); 1245 M Radio History of the World, T Heart and Soul (spiritual matters), W What's the Problem? (advice), H It's a Girl (women in societies), F Patterns of Faith.

BBC World Service (eas) - 6195, 9740, 15360

1200 S Play of the Week (cont'd. from 1130), M-A News; 1205 M-F Outlook (magazine), A Just a Minute (panel game); 1230 S Agenda (trends), A Assignment; 1245 M Patterns of Faith (religion), T Radio History of the World, W Heart and Soul (spiritual matters), H Best of 'The Edge', F It's a Girl (women in societies).

BBC World Service (sas) - 15310, 17700

1200 D News; 1205 S Write Around the World (music requests), M-F Outlook (magazine), A Just a Minute (panel game); 1235 A Greenfield Collection (classical music); 1245 M Patterns of Faith (religion), T Radio History of the World, W Heart and Soul (spiritual matters), H Best of 'The Edge', F It's a Girl (women in societies).

HCJB, Ecuador

1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from 1130 w/News & Sports 1200, Insights 1205, Mission Network News 1224, News 1230, Church Doctor 1233, Did You Hear? 1245), A Adventures in Odyssey; 1230 S The Living Word, A Toonz 1200.

Radio Australia

1200 D News; 1205 S Country Club (country music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

Radio Korea International

1200 S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Korea Today & Tomorrow, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

Shortwave Guide



Radio Netherlands

1200 S The Sound Fountain ("a torrent of ideas"), M EuroQuest (Europe in context), T A Good Life (development issues), W Dutch Horizons, H Research File (science), F Documentary, A Roughly Speaking (youth culture); **1230 S** Dutch Horizons, M Research File, T Music 52-15 (international music), W Documentary, H The Sound Fountain, F A Good Life, A The Sound Fountain.

Radio for Peace International, Costa Rica

1200 S World of Radio, M Spiritual Awakening, T A Freespeech Radio News (Pacifica Reporters Against Censorship daily newscast); **1230 S** RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation" magazine), F This Way Out (lesbian/gay magazine); **1235 T/H/A** Earthwatch (ecology); **1240 T/H/A** Earth & Sky (astronomy); **1245 T** Tropical Conservation Newsbeureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

Radio Sweden

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1245 M** Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WWCR, Tennessee

5070 kHz.: **1200 S** Profiles; **1205 A** This Week in Americana (antiques/collectibles). 15685 kHz.: **1200 T** World of Radio; **1210 A** A View from Europe; **1215 A** Eco Watch (ecology); **1230 M** We Believe, A World of Radio.

1300 UTC/ 8am E/5am P - Page 49 Freqs

BBC World Service (am) - 6195, 15790

1300 D News; **1301 S** Concert Hall; **1305 M-F** Outlook (magazine), A Jazzmatazz; **1330 A** People & Politics; **1345 M-F** Off the Shelf (book readings).

BBC World Service (eu) - 12095, 15485

1300 D News; **1305 S** The Alternative (music), M-F Outlook (magazine), **1305 A** Wright Around the World (music requests); **1330 S** Global Business; **1345 M** Radio History of the World, T Heart and Soul (spiritual matters), W What's the Problem? (advice), H It's a Girl (women in societies), F Patterns of Faith (religion).

BBC World Service (me) - 15565, 15575, 17640

1300 D Newshour.

BBC World Service (wcaf) - 17830

1300 D News; **1305 S** Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatazz; **1330 M** Composer of the Month, T Music Mix, W UK Top 20, H Just a Minute (panel game), F World of Music, A Arts in Action.

BBC World Service (esaf) - 21470

1300 D News; **1305 S** Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatazz; **1330 M** Composer of the Month, T Music Mix, W UK Top 20, H Just a Minute (panel game), F World of Music, A People and Politics.

BBC World Service (eas)(sas) - 6195, 9740, 15310, 15360, 17700

1300 D Newshour; **1350 M-F** World Business Report.

Channel Africa

1300 S/A Channel Africa Extra (weekend variety magazine).

China Radio International

1300 D News; **1310 S** Report on Developing Countries, M-F Current Affairs, A Global Review; **1320 S** In the Spotlight (cultural magazine), A Listeners' Garden; **1330 M** People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCIB, Ecuador

1300 S Viewpoint, M-F Precept, A Toonz! (from 1230); **1313 M-F** Getting the Message; **1315 M-F** Proclaim; **1330 S** Mountain Meditations, M-F Family Life Today, A Rock Solid.

Radio Australia

1300 D News; **1305 S** Country Club (cont'd. from 1205), A The Science Show; **1310 M-F** Regional Sports Report; **1315 M-F** The Planet (diverse music from around the world).

Radio Canada International

1300 M-F News; **1310 M-F** This Morning (magazine).

Radio Netherlands

1300 S/A News, M-F Newsline; **1305 S** Sincerely Yours (listener letters), A Europe Unzipped.

Radio for Peace International, Costa Rica

1300 S Making Contact, M Every Living Thing (nature), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F Far Right Radio Review, A Continent of Media; **1330 S** Alternative Radio (political/social analysis), T Earthspan (War & Peace Foundation), W RFPI Mailbag, A World of Radio.

WHRI, Indiana

6040 kHz.: **1300 A** DXing with Cumbe. 15105 kHz.: **1330 A** DXing with Cumbe.

WWCR, Tennessee

5070 kHz.: **1305 A** Rock the Universe (Christian rock music). 15685 kHz.: **1330 H** Communications World; **1345 M** Eco Watch (ecology).

Radio Sweden

1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1345 M** Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

YLE Radio Finland

1330 M-H Finland This Morning (magazine), F-S News; **1335 S/F** Capital Cafe (conversations), A Finland This Week (review); **1345 A** Starting Finnish (language course).

1400 UTC/ 9am E/6am P - Page 49 Freqs

BBC World Service (am) (sas) - 15190, 15310, 17700

1400 D News; **1405 S** Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); **1430 M** Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; **1445 W** UK Album Chart, F Music X-Press.

BBC World Service (eu) - 12095, 15485

1400 D News; **1405 S** Talking Point (global phone-in), M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Sportsworld (live action); **1430 M** Composer of the Month, T Music Mix, W UK Top 20, H Just a Minute (panel game), F World of Music.

BBC World Service (me) (wcaf) - 15565, 17640, 17830

1400 D News; **1405 S** Talking Point (global phone-in), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Sportsworld (live action); **1430 M** Essential Guide, T Everywoman, W Focus on Faith (religion), H Pick of the World (BBC's best), F People and Places.

BBC World Service (esaf) - 21470, 21660

1400 S/A News, M-F World Briefing; **1405 S** Talking Point (global phone-in), A Sportsworld (live action); **1420 M-F** World Business Report; **1430 M-F** British News; **1445 M-H** Sports Roundup, F Football Extra.

BBC World Service (eas) - 6135, 6195, 9740

1400 S/A News, M-F East Asia Today; **1405 S** Talking Point (global phone-in), A Sportsworld (live action); **1430 M-F** British News; **1445 M-H** Sports Roundup, F Football Extra.

Channel Africa

1400 S/A Channel Africa Extra (cont'd. from 1300).

China Radio International

1400 D News; **1410 S** Report on Developing Countries, M-F Current Affairs, A Global Review; **1420 S** In the Spotlight (cultural magazine), A Listeners' Garden; **1430 M** People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCIB, Ecuador

1400 S Renewing Your Mind, M-F Haven, A Rock Solid (from 1330).

Radio Australia

1400 D News; **1405 S** Books & Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

Radio Canada International

1400 D News; **1405 S** The Sunday Edition (arts/ideas magazine), M-F This Morning (cont'd. from 1310), A The House (Canadian politics).

Radio Japan

1400 D News; **1410 S** Pop Goes Asia, A Weekend Square (Japanese life); **1415 M-F** 44 Minutes (feature magazine).

Radio for Peace International, Costa Rica

1400 S Alternative Radio (from 1330), M New Dimensions ("progressive" ideas), T University Forum (interviews), W Continent of Media, H WINGS (women's news), F RadioNation ('The Nation' magazine), A RFPI Mailbag; **1430 S** Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W TUC Radio, H Global Community Forum (interviews), F A Woman's Voice, A Disability Radio Worldwide.

Radio Prague

1400 D News; **1405 S** Letter from Prague, M-F Current Affairs, A Readings from Czech Literature; **1410 S** The Arts, A Saturday Music (classical/folk/azz); **1415 S** Mailbox, M Spotlight (Czech current events) or One on One (interview), W Czechs in History or Central Europe Today, F Magazine; **1420 T** Talking Point, H Economic Report.

WWCR, Tennessee

15685 kHz.: **1415 A** Ask WWCR (letters).

Radio Netherlands

1430 S/A News, M-F Newsline; **1435 S** Wide Angle (week in review), A Europe Unzipped; **1455 S** The Week Ahead (program previews), A Insight (commentary).

Radio Sweden

1430 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1445 M** Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

1500 UTC/ 10am E/7am P - Page 50 Freqs

BBC World Service (am) - 15190

1500 D News; **1501 S** The Alternative (music), **1505 M** One Planet (ecology), T Discovery (science), W Health Matters, H Go Digital, F Sports International, A Sportsworld (live action); **1530 S** Composer of the Month, M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best).

BBC World Service (eu) - 9410, 12095, 15485

1500 D News; **1505 S** Assignment, M Discovery (science), T Health Matters, W Go Digital, H Sports International, F One Planet (ecology), A Sportsworld (live action); **1530 S** People and Politics, M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places.

BBC World Service (me) - 15565

1500 S/A News, M-F World Briefing; **1501 S** Concert Hall; **1505 M** Sportsworld; **1530 M-F** British News; **1545 M-F** Sports Roundup.

BBC World Service (wcaf) - 15400, 17830

1500 D News; **1501 S** Play of the Week; **1505 M-F** Focus on Africa, A Sportsworld; **1530 M-F** World Learning (instructional series).

BBC World Service (esaf) - 21470, 21660

1500 D News; **1501 S** The Alternative (music), **1505 M-F** Focus on Africa, A Sportsworld; **1530 M-F** World Learning (instructional series).

BBC World Service (eas) - 6195, 9740

1500 D News; **1501 S** The Alternative (music); **1505 M** Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); **1530 M** Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; **1545 W** UK Album Chart, F Music X-Press.

BBC World Service (sas) - 15310, 17700

1500 S/A News, M-F World Briefing; **1501 S** Play of the Week (radio drama); **1505 A** Sportsworld; **1530 M-F** British News; **1545 M-F** Analysis, W From Our Own Correspondent.

China Radio International

1500 D News; **1510 S** Report on Developing Countries, M-F Current Affairs, A Global Review; **1520 S** In the Spotlight (cultural magazine), A Listeners' Garden; **1530 M** People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

1500 D News; **1505 S** Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Melisma (innovative music); **1530 M** Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

Shortwave Guide



Radio Austria International

1530 D Report from Austria (magazine); 1535 S Radio E, A Week in Review; 1550 A Listener Letters.

Radio Canada International

1500 D News; 1505 S The Sunday Edition (cont'd. from 1410), M-F This Morning (cont'd. from 1310), A Vinyl Café (humor/music); 1530 F C'est La Vie (life in French Canada); 1545 M-H Out Front (short features by independent producers).

Radio Netherlands

1500 S Dutch Horizons, M Research File (science), T Music 52-15 (international music), W Documentary, H The Sound Fountain ("a torrent of ideas"), F A Good Life (development issues), A The Sound Fountain; 1530 S The Sound Fountain, M EuroQuest (Europe in context), T A Good Life, W Dutch Horizons, H Research File, F Documentary, A Roughly Speaking (European youth culture).

Radio for Peace International, Costa Rica

1500 S Far Right Radio Review (from 1430), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 1430), W Living Enrichment Center, H Global Community Forum (from 1430), F A Woman's Voice (from 1430), A Earthspan (War & Peace Foundation); 1530 S Peace Forum, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation NewsHour (rainforest), A Newmaier Report; 1545 S/M Hightower Report (commentary), T-A UN Today; 1548 S/M Earthwatch (ecology); 1551 S/M Earth & Sky (astronomy); 1555 S/M World Opinion (on terrorism).

Voice of Russia

1500 D News; 1511 S Sunday Panorama, M-A News & Views; 1520 S Russia: People and Events; 1530 D News in Brief; 1532 S Kaleidoscope, M Folk Box, T/H Yours for the Asking, W Jazz Show, F Moscow Yesterday & Today, A Timelines; 1547 Music At Your Request.

WWCR, Tennessee

12160 kHz.: 1505 A Golden Age of Radio Theatre.

1600 UTC/ 11am E/8am P - Page 50 Freqs

BBC World Service (am) - 15190

1600 S-F World Briefing, A News; 1605 S Sportsworld (live action); 1620 S British News; 1630 S Reporting Religion, M/F H/F Analysis, W From Our Own Correspondent; 1645 M-F Sports Roundup.

BBC World Service (eu) - 9410

1600 S/A News, M-F World Briefing; 1601 S Concert Hall; 1605 A Sportsworld (live action); 1620 M-F British News; 1630 M/F H/F Analysis, W From Our Own Correspondent, F Analysis or The New Europe (4th wk); 1645 M-F Sports Roundup.

BBC World Service (me) - 12095, 15565

1600 S World Briefing, M-A News; 1605 M-F Outlook (magazine), A Sportsworld (live action); 1620 S British News; 1630 S Reporting Religion; 1645 S Sports Roundup, M Patterns of Faith (religion), T Radio History of the World, W Heart and Soul (spiritual matters), H What's the Problem? (advice), F It's a Girl (women in societies).

BBC World Service (af) - 15420, 17830, 21470, 21660

1600 S World Briefing, M-A News; 1605 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1620 S British News; 1630 S Reporting Religion, M/F Fast Track (African sport), T African Perspective, W Talkabout Africa, H Arbeat; 1645 S Sports Roundup.

BBC World Service (sas) - 15310, 17700

1600 S World Briefing, M-A News; 1605 M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science), A Sportsworld (live action); 1620 S British News; 1630 S Reporting Religion, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide; 1645 S Sports Roundup.

HCIJ, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

Radio Australia

1600 D News; 1605 S The National Interest (Australian politics), M Margaret Throsby (interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAY! (Aboriginal culture), A Melisma (cont'd. from 1505); 1630 W Earshot (Australian voices).

Radio Canada International

1600 S/A News; 1605 S The Sunday Edition (cont'd. from 1410), A Quirks and Quarks (science).

Radio Netherlands

1600 S/A News, M-F Newsline; 1605 S Sincerely Yours (listener letters), A Europe Unzipped.

Radio for Peace International, Costa Rica

1600 S Music Medicine, M-F Democracy Now! in Exile, A CounterSpin (media analysis); 1630 A Freespeech Radio News (repeat of Fri. newscast).

Voice of Russia

1600 D News; 1611 S Moscow Mailbag, M-F Focus on Asia and the Pacific, A Newmarket; 1630 D News in Brief; 1632 S Russian by Radio, T This is Russia, T Moscow Yesterday & Today, W Audio Book Club, H Folk Box, F Songs from Russia, A Kaleidoscope; 1647 You Write to Moscow.

WWCR, Tennessee

5070 kHz.: 1600 M A View from Europe.

1700 UTC/ 12pm E/9am P - Page 51 Freqs

BBC World Service (eu) - 9410

1700 S News, M-F Europe Today, A World Briefing; 1705 S Sportsworld (live action); 1720 A British News; 1730 M-F World Business Report, A Sportsworld; 1745 M-F Sports Roundup.

BBC World Service (me) - 15565

1700 S-F News, A World Briefing; 1705 S Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1720 A British News; 1730 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Sportsworld; 1745 W UK Album Chart, F Music X-Press.

BBC World Service (af) - 17830, 21470

1700 D News; 1705 D Focus on Africa; 1745 S/A Sportsworld (live action), M-F Sports Roundup.

Radio Australia

1700 D News; 1705 S The Spirit of Things (spiritual matters), M-F Bush Telegraph (rural life), A New Dimensions ("progressive" ideas).

Radio Japan

1700 D News; 1710 S Hello from Tokyo (listener contact), A Pop! Goes Asia; 1715 M-F 44 Minutes (feature magazine).

Radio for Peace International, Costa Rica

1700 S Neumaier Report, M-F Democracy Now! in Exile (cont'd. from 1600), A TUC Radio; 1715 S Living Enrichment Center; 1730 A Continent of Media.

Voice of Russia

1700 D News; 1711 S/T Science & Engineering, N/H Newmarket, W/F Moscow Mailbag, A Music & Musicians; 1730 S-F News in Brief; 1732 S Timelines, N/W/F 20th Century, T/H Cultural programs.

WWCR, Tennessee

15685 kHz.: 1700 M-F World Wide Country Radio (country music); 1745 A New Horizons (science).

1800 UTC/ 1pm E/10am P - Page 51 Freqs

BBC World Service (eu) - 9410

1800 D News; 1801 S Play of the Week (radio theatre); 1805 M-F Outlook (magazine), A Global Business; 1830 A Agenda (trends); 1845 M Patterns of Faith, T Radio History of the World, W Heart and Soul (religion), H What's the Problem? (advice), F It's a Girl (women in societies).

BBC World Service (wcaf) - 15400, 17830

1800 D World Briefing; 1820 D British News; 1830 S Assignment, M-F World Business Report, A World Business Review; 1845 M/F H/F Analysis, W From Our Own Correspondent, A Letter from America.

BBC World Service (esaf) - 9630, 21470

1800 S/A World Briefing, M-F News; 1805 M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science); 1820 S/A British News; 1830 S Assignment, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A World Business Review; 1845 A Letter from America.

Radio Australia

1800 D News; 1805 S-H Pacific Beat (regional magazine), F Pacific Review, A Educational series; 1830 F Educational series.

Radio for Peace International, Costa Rica

1800 S Spiritual Awakening, M Steppin' Out of Babylon, T RadioNation ('The Nation' magazine), W A Better World, H Like It Is, F WINGS (women's news), A World of Radio; 1830 S One World—One Family (Bahai program), M/W/F Hightower Radio (commentary), T Radio Nation ("The Nation" magazine), H This Way Out (lesbian/gay magazine), A RPPI Mailbag; 1835 M/W/F Earthwatch (ecology); 1840 M/W/F Earth & Sky (astronomy); 1845 M Tropical Conservation Newsureau (rainforests), W World Citizen's Weekly Commentary, F Women (UN program).

Voice of Russia

1800 D News; 1811 S Music & Musicians, M/H/S Moscow Mailbag, T/F Newmarket, W Science & Engineering; 1830 M-A News in Brief; 1832 M Kaleidoscope, T Yours for the Asking, W Moscow Yesterday & Today, H Russian Musical Portraits of 20th Century, F Folk Box, A Songs from Russia; 1846 T Music At Your Request, A You Write to Moscow; 1854 H Russia: People & Events.

1900 UTC/ 2pm E/11am P - Page 52 Freqs

BBC World Service (eu) - 9410

1900 S/A World Briefing, M-F News; 1905 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1920 S/A British News; 1930 S Science in Action, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A World Business Review; 1945 W UK Album Chart, F Music X-Press, A Letter from America (Alistair Cooke comments).

BBC World Service (wcaf) - 15400, 17830

1900 D News; 1905 S From Our Own Correspondent, M-F Focus on Africa, A Westway Omnibus (drama serial); 1930 S It's a Girl (women in societies), M/F Fast Track (African sport), T Arbeat, W Talkabout Africa, H Postmark Africa; 1935 A Greenfield Collection (classical music requests).

BBC World Service (esaf) - 9630, 12095

1900 S-F News, A World Briefing; 1905 S Wright Around the World (music requests), M-F Focus on Africa; 1920 A Sports Roundup; 1930 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Science in Action; 1945 W UK Album Chart, F Music X-Press.

Radio Australia

1900 D News; 1905 S-H Pacific Beat (regional magazine), F Pacific Focus (health), A Australia All Over; 1930 F In Conversation.

Radio for Peace International, Costa Rica

1900 S Every Living Thing (nature), M Disability Radio Worldwide, T World of Radio, W A Public Affair, H Far Right Radio Review, F Contain of Media, A Making Contact; 1930 M Earthspan (War & Peace Foundation), T RPPI Mailbag, F World of Radio, A Alternative Radio (political/social analysis).

Voice of Russia

1900 D News; 1911 S Sunday Panorama, M-A News & Views; 1924 S Russia: People & Events; 1930 D News in Brief; 1932 S/T This is Russia, M Moscow Yesterday & Today, W Kaleidoscope, H Audio Book Club, F Russian by Radio, A Christian Message from Moscow.

WHJ, Indiana

13760 kHz.: 1900 A DXing with Cumbre.

WWCR, Tennessee

12160 kHz.: 1945 A Money Matters.

2000 UTC/ 3pm E/12pm P - Page 52 Freqs

BBC World Service (eu) - 9410

2000 S World Briefing, M-F News, A News; 2001 A From Our Own Correspondent; 2005 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 2020 S Sports Roundup; 2030 S Science in Action, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (af) - 9630, 12095, 15400, 17830

2000 D NewsHour, 2050 D Sports Roundup.

Radio Australia

2000 D News; 2005 S-H Pacific Beat (regional magazine), F Pacific Review, A Australia All Over (cont'd. from 1905); 2030 F Country Breakfast (rural issues); 2045 A News; 2050 A Asia Sunday.

Radio for Peace International, Costa Rica

2000 S New Dimensions ("progressive" ideas), M University Forum (interviews), T Continent

Shortwave Guide



of Media, W WINGS (women's news), H RadioNation ('The Nation' magazine), F RFI Mailbag, A Alternative Radio (from 1930), **2030** M Honoring Mother Earth: Indigenous Voices, T TUC Radio, W Global Community Forum (interviews), H A Woman's Voice, F Disability Radio Worldwide, A Far Right Radio Review.

Voice of Russia

2000 D News; **2011** S Music & Musicians, N/H Science & Engineering, T/F Moscow Mailbag, W/A Newmarket; **2030** M-A News in Brief; **2032** M Songs from Russia, T/Yours for the Asking, W Musical Portraits of 20th Century, H Folk Box, F Jazz Show, A Russian by Radio; **2046** M Your Write to Moscow, T Music At Your Request; **2054** W Russia: People & Events.

2100 UTC/ 4pm E/1pm P - Page 53 Freqs

BBC World Service (am) - 5975, 12095

2100 S/A Newshour, M-F News; **2105** M Discovery (science), T Health Matters, W Go Digital, H Sports International, F One Planet (ecology); **2130** M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People and Places.

[Special service to the Caribbean on 5975, 71165, 15190 kHz; **2105** M-F Caribbean Report, Special service to the Falklands on 11680 kHz; **2130** T/F Calling the Falklands.]

BBC World Service (eu) - 9410

2100 D Newshour.

BBC World Service (wca) - 11835, 15400

2100 D News; **2105** S Wright Around the World (music requests), M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science), A Science in Action; **2130** M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A People and Politics.

Radio Australia

2100 D News; **2105** F Feedback (letters), A Australia All Over (cont'd from 1905); **2110** S-H AM (morning news magazine); **2130** S Educational series, M Health Report, T Innovations, W Religion Report, H Rural Reporter, F Oz Sounds (new music releases); **2145** A Asia Sunday.

Radio Japan

2100 D News; **2110** S Weekend Square, A Pop! Goes Asia; **2115** M-F Asian Top News (headlines from region's radio); **2125** M Unforgettable Music Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio for Peace International, Costa Rica

2100 S Voices of Our World (Maryknoll program), M Honoring Mother Earth: Indigenous Voices (from 2030), T Living Enrichment Center, W Global Community Forum (from 2030), H A Woman's Voice (from 2030), F Earthspan (War & Peace Foundation), A Far Right Radio Review (from 2030); **2130** S Perspective (UN program), M In the Moment, T Peace Forum, W Scope (UN program), H Tropical Conservation Newshour (rainforests), F Neumaier Report, A Peace Forum; **2145** S/A Hightower Report (commentary), M-F UN Today; **2148** S/A Earthwatch (ecology); **2151** S/A Earth & Sky (astronomy); **2155** S/A World Opinion (on terrorism).

Radio Prague

2100 D News; **2105** S Letter from Prague, M-F Current Affairs, A Readings from Czech Literature; **2110** S The Arts, A Saturday Music (classical/folk/jazz); **2115** S Mailbox, M Spotlight (Czech current events) or One on One (interview), W Czechs in History or Central Europe Today, F Magazine; **2120** T Talking Point, H Economic Report.

WBCQ, Maine

7415 kHz: **2100** H-S Radio Caroline.

WWCR, Tennessee

15685 kHz: **2100** F Ask WWCR (letters); **2115** H Eco Watch, F New Horizons (science); **2130** H World of Radio, A Presidential Radio Address/Democratic Response.

12160 kHz: **2100** H Keen on Jazz; **2105** S Golden Age of Radio Theatre, **2145** A Ask WWCR (letters).

2200 UTC/ 5pm E/2pm P - Page 54 Freqs

BBC World Service (am) - 5975, 12095

2200 S/A The World Today, M-F News; **2205** M-F World Business Report; **2220** M-F British News; **2230** M-F Sports Roundup, A From Our Own Correspondent; **2245** M/T/H/F Analysis, W From Our Own Correspondent.

BBC World Service (eu) - 6195 via UK

2200 D News; **2205** S Meridian-Masterpiece, M-F World Business Report, A Jazzmatazz; **2220** M-F British News; **2230** S Agenda (trends), M-F Sports Roundup, A Composer of the Month; **2245** M-F Off the Shelf (book readings).

BBC World Service (wca) - 11835, 15400

2200 D News; **2205** S Just a Minute (panel game), M-F Outlook (magazine), A Omnibus (documentary); **2230** S World of Music, A From Our Own Correspondent; **2245** M Patterns of Faith, T Radio History of the World, W Heart and Soul (religion), H What's the Problem? (advice), F It's a Girl (women in societies).

BBC World Service (eus) - 6195 via Singapore, 7105, 11685

2200 D The World Today; **2230** F People and Politics, A From Our Own Correspondent.

Radio Australia

2200 D News; **2205** F Asia Pacific Weekend Edition (regional current affairs), A Correspondents Report; **2210** S-H AM (morning news magazine); **2230** F AM (morning news magazine), A Business Report; **2240** S Australian Music Show (rock), M Music Deli (international), T Blacktracker (Aboriginal contemporary music), W Country Style, H Jazz Notes.

Radio for Peace International, Costa Rica

2200 S Music Medicine, M-F Democracy Now! in Exile, A CounterSpin (media analysis); **2230** A Freespeech Radio News (repeat of Fri. newscast).

Radio Prague

2230 D News; **2235** S Letter from Prague, M-F Current Affairs, A Readings from Czech Literature; **2240** S The Arts, A Saturday Music (classical/folk/jazz); **2245** S Mailbox, M Spotlight (Czech current events) or One on One (interview), W Czechs in History or Central Europe Today, F Magazine; **2250** T Talking Point, H Economic Report.

Radio Vlaanderen International

2230 S Radio World, M-F News, A Music from Flanders; **2234** M-F Belgium Today; **2238** S Tourism in Flanders, M-F Press Review; **2243** M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; **2244** S Brussels 1043 (letters); **2248** M Sports, W Around Town, H International Report, F Tourism in Flanders; **2254** S-F Soundbox (Flemish rock).

WBCQ, Maine

7415 kHz: **2200** S Communications World, M Jean Shepherd, W Uncle Ed's Musical Memories, F Julie's Wild Kingdom, A HorvZower; **2230** S The Planet, F Pub Sungeis Project; **2245** M Seldom Heard Radio.

WHRI, Indiana

5745 kHz: **2200** S DXing with Cumbre. 9495 kHz: **2200** S DXing with Cumbre. 17650 kHz: **2200** F DXing with Cumbre; **2230** A DXing with Cumbre.

WWCR, Tennessee

9475 kHz: **2215** F World of Radio.

2300 UTC/ 6pm E/3pm P - Page 54 Freqs

BBC World Service (am)(eu) - 5975, 6195 via UK, 12095

2300 D The World Today; **2330** S Greenfield Collection (classical music), F Global Business, A Arts in Action.

BBC World Service (eus) - 6195 via Singapore, 7105, 11685

2300 D The World Today; **2330** F Global Business, A Arts in Action.

China Radio International

2300 D News; **2310** S Report on Developing Countries, M-F Current Affairs, A Global Review; **2320** S In the Spotlight (cultural magazine), A Listeners' Garden; **2330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

2300 D News; **2305** F Lingua Franca (about language), A Ockham's Razor (science issue); **2310** S-H Asia Pacific (regional current affairs); **2330** S Earthbeat (ecology), M The Buzz (technology issues), T Arts Talk, W Rural Reporter, H Media Report, F In Conversation, A Innovations (new products).

Radio Canada International

2300 S/A The World This Weekend, M-F The World at 6; **2330** S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

Radio Netherlands

2330 S/A News; M-F Newsline; **2335** S Sincerely Yours (letters), A Europe Unzipped; **2355** S The Week Ahead (program previews), A Insight (commentary).

Radio New Zealand International

2300 S-H Midday Report (including Rural News 2333, World Watch 2345), F/A RNZ News;

2312 F Focus on Politics, A This Week in Parliament; **2333** F The Sampler (latest CDs), A Spectrum (life in NZ).

Radio for Peace International, Costa Rica

2300 S Neumaier Report, M-F Democracy Now! in Exile (cont'd from 2200), A TUC Radio; **2315** S Living Enrichment Center; **2330** A Continent of Media.

Radio Prague

2330 D News; **2335** S Letter from Prague, M-F Current Affairs, A Readings from Czech Literature; **2340** S The Arts, A Saturday Music (classical/folk/jazz); **2345** S Mailbox, M Spotlight (Czech current events) or One on One (interview), W Czechs in History or Central Europe Today, F Magazine; **2350** T Talking Point, H Economic Report.

Radio Romania International

2300 D Radio Newsreel; **2310** S Focus, M-F Commentary, A The Week; **2315** S Sunday Studio, M Pro Memoria (history), T Business Club, W Society Today, H Cards on the Table (debate) or The Romanian Next to You (interview), F Challenge for the Future or Terra 2001, A World of Culture; **2320** M Political Flash, T European Horizons, A RRI Encyclopedia; **2325** S Romanian by Radio, M/W/F Business Update, T Tourist News, H Listeners' Letterbox, A Roots (culture/traditions); **2330** S Romanian Itineraries, M Pulse of Transition, T Mother Nature (ecology), W Visit Romania, F Practical Guide, A Radio Pictures; **2335** S Listeners' Letterbox, M Performing Arts, T Youth Club, W Partners in a Changing World, F Cultural Survey, A Romanian Itineraries; **2340** M Pages of Romanian Literature, T/H Skylark (folk music), W Stage and Screen, F Spectator (voice of the people), A Bucharest Along the Centuries; **2345** M Romanian Hits, W Romanian Musicians, F Romanian Folk Music At Its Best, A DX Mailbag; **2350** S Romanian Folk Music At Its Best, M Sports Roundup, T Athlete of the Week, W Sports Club, H Football Flash, F Sports Weekend.

WBCQ, Maine

7415 kHz: **2300** M Seldom Heard Radio (occasional program), F Pub Sungeis Project (from 2230), A Radio Timtron Worldwide; **2330** F International World Beat Music.

WHRI, Indiana

9495 kHz: **2330** A DXing with Cumbre.

WWCR, Tennessee

5070 kHz: **2300** A Keen on Jazz.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

John Babbis, Silver Spring, MD; Bob Fraser, Cohasset, MA; Harold Fodge, Midland, MI; Frank Hillton, Charleston, SC; Hans Johnson, WY/Ulis Fleming, MD /Cumbre DX/BBCM; Michael Murray, UK; Zeke Russell, Williams, AZ; Daniel Sampson, Arcadia, WI; Harold Sellers, Lee Silvi, Mentor, OH; Larry Van Horn, Brasstown, NC; Sam Wright, Biloxi, MS; DX Listening Digest; DX Ontario; Hard Core DX; Radio Sweden/Media Scan; Bob Thomas, Bridgeport, CT; Usenet Newsgroups; World of Radio; Worldwide DX Club.



Lawrence Harris

Lawrence@itchycoo-park.freeserve.co.uk

<http://www.itchycoo-park.freeserve.co.uk/wxsats.htm>

Ups and Downs of Russian Birds

It seems that the Russian weather satellite (WXSAT) Resurs 01-N4 ceased operations permanently when it failed back in August. During following weeks, the satellite's ground controllers made a number of attempts to fix the problems, resulting in the 137.85 MHz carrier being heard occasionally for a few orbits, though with no modulation (picture detail). An e-mail from Eugene Flitman, the leading software engineer of the Russian Space Monitoring and Information Support Laboratory (operated by the Space Research Institute in Moscow), told me: "Currently it is dead. They tried to revitalize it last week but with no success, but there will be more attempts soon. However, no official statements about its complete failure have been made so far."

A few weeks after Resurs failed, NOAA-14 entered a fault mode similar to that which affected NOAA-15 some months back. At approximately 1955 UTC on October 18, the NOAA-14 AVHRR scan motor current suddenly increased, indicating a failure similar to the problem on NOAA-15. At 1205 UTC October 19, the NOAA-14 Manipulated Instrument Rate Processor (MIRP) was switched to internal synchronization so that instrument data – other than the AVHRR (the scanner that produces images) – could be processed. AVHRR will therefore be severely degraded most of the time. NOAA and NASA engineers continue to investigate the problem.

As of early November, NOAA-14 continues to transmit high and low resolution images, but they are unusable. Based on past successes, I anticipate that NOAA controllers will identify a procedure that rescues NOAA-14 from permanent failure.

◆ Okean-O active

The Okean series of Russian/Ukrainian oceanographic resources satellites are rarely heard transmitting away from Europe. The satellites – Okean-O, Okean 01-N4 and Sich-1 – carry different equipment from conventional WXSATs, but transmit at least one compatible image format – APT. Over recent years, information about the series has become available thanks to the Internet and Russian/Ukrainian scientists who seem keen to have their research become more widely known in the west, as well as in their home countries.

Earlier this year I received a package from Volodymyr Astapenko of Dnipropetrovsk in the Ukraine. He sent me an Okean calendar for 2001 that includes a large number of pictures of the Ukraine, together with some amazing pictures taken by the satellite as part of its resources imaging work. Another publication, devoted to the satellite's systems and operation, was included.

Unlike NOAA and Meteor constellations, Okean-O carries a dual radar system operating in the 3cm (0.03m) band designed to scan the earth from space and produce ground images independent of the weather. The radar comprises a right-side (of the ground track) and left-side looking system; the scanner's resolution is 2.5km along ground track, and 1.3km across it. Equipment onboard includes multi-spectral low, medium and high resolution scanning radiometers. A microwave scanning radiometer and polarization spectro-radiometer complete the systems. Some data is transmitted using the 8.2 GHz downlink.

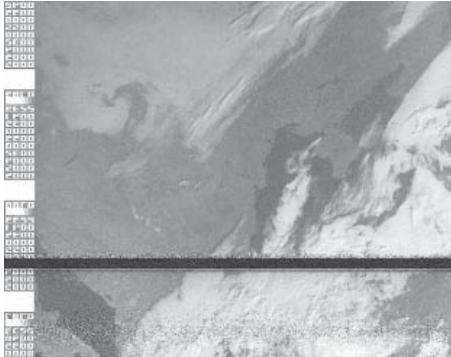


Fig 1 OKEAN-O image received on November 4, 2001 at 0742UTC by Mike Jupp in Britain

All VHF transmissions from these satellites have been on 137.40 MHz, though to be accurate, that from Sich-1 is often a little off frequency. Transmissions are scheduled during passes over Russia and Ukraine; monitors in western Europe occasionally record short transmissions from the spacecraft. In Britain, a number of people leave recording equipment active to catch early morning Okean passes. Although these are high over central Europe, they are almost always low over Britain, and the image recorded by Mike Jupp is typical in being of short duration and

subject to noise bursts inherent at low elevations. Figure 1 shows a typical scan taken over the region of the Black Sea and Ukraine. The image is a visible light scan.

◆ New to the hobby

Russell Hall e-mailed me his first APT image, received with a home-built quadrifilar helix antenna (QFH), a GRE Super preamp, and an Icom R10 receiver. Russell is still experimenting to find an optimum position for the antenna, and finding the best software settings to produce the best images.

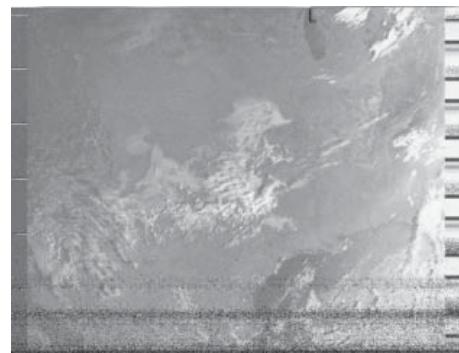


Fig 2: NOAA-15 APT image early November from Russell Hall

I would like to thank those readers who have corresponded with information during the past year, and to wish everyone a very Happy Christmas and Peaceful New Year.

Frequencies

NOAA-14 transmits APT on 137.62 MHz (currently in fault condition)

NOAA-12 and **-15** transmit APT on 137.50 MHz

Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight

Resurs 1-4 transmits APT on 137.85 MHz (currently failed)

Okean-O, Okean-4 and Sich-1 sometimes transmit APT briefly on 137.40 MHz

GOES-8 and GOES-10 use 1691 MHz for WEFAX

Satellite Service Guide

Robert Smathers

roberts@nmia.com

www.grove-ent.com/mtssg.html

All Frequencies MHz



Loral Skynet Telstar 6 - C-Band

93 degrees West longitude		
1(V)	3720	Occasional video
2(H)	3740	Data Transmissions
3(V)	3760	(none)
4(H)	3780	Occasional video
5(V)	3800	Fox Network feeds (analog and digital)
6(H)	3820	(none)
7(V)	3840	Occasional video
8(H)	3860	Occasional video / Horse Racing (digital)
9(H)	3880	Occasional video
10(V)	3900	Occasional video
11(H)	3920	Horse Racing (digital)
12(V)	3940	Horse Racing (digital)
13(H)	3960	Horse Racing (digital)
14(V)	3980	Horse Racing (digital)
15(H)	4000	Occasional video
16(V)	4020	HBO Plus (East) (VC2+)
17(H)	4040	MoreMax (East) (VC2+)
18(V)	4060	Occasional video
19(H)	4080	HBO Signature (East) (VC2+)
20(V)	4100	HBO Plus (West) (VC2+)
21(H)	4120	Occasional video
22(V)	4140	Horse Racing (digital)
23(H)	4160	Occasional video
24(V)	4180	Gem Shopping Network (digital) / Horse Racing (digital)

Loral Skynet Telstar 6 - Ku-Band

93 degrees West longitude		
1(V)	11728.5	CBS Newsnet (digital) / CBS news feeds (digital)
2(H)	11735.0	Reuters news feeds (digital)
3(V)	11789.5	CBS news feeds (digital)
4(H)	11796.0	Occasional video
5(V)	11836.0	Data Transmissions
6(H)	11842.5	Data Transmissions
7(V)	11867.0	Occasional video
8(H)	11873.5	WSNet (digital)
9(V)	11898.0	WSNet (digital)
10(H)	11904.5	WSNet (digital)
11(V)	11929.0	CBS news feeds (digital and analog)
12(H)	11935.5	Occasional video
13(V)	11960.0	Occasional video
14(H)	11966.5	Occasional video
15(V)	11991.0	WSNet (digital)
16(H)	11997.5	Occasional video
17(V)	12022.0	Occasional video
18(H)	12028.5	WSNet (digital)
19(V)	12053.0	Occasional video
20(H)	12059.5	Occasional video
21(V)	12084.0	Data Transmissions
22(H)	12090.5	WSNet (digital)
23(V)	12115.0	Occasional video
24(H)	12121.5	Learning Satellite Network (digital)
25(V)	12146.0	Occasional video
26(H)	12152.5	Data Transmissions
27(V)	12177.0	WSNet (digital)
28(H)	12183.5	Occasional video

Panamsat Galaxy 3R - C-Band

95 degrees West longitude		
1(H)	3720	Occasional video
2(V)	3740	Occasional video
3(H)	3760	Occasional video
4(V)	3780	Occasional video

5(H)	3800	Occasional video	3(V)	3760	Occasional video
6(V)	3820	Occasional video	4(H)	3780	Nebraska Educational TV (digital)
7(H)	3840	Occasional video	5(V)	3800	Occasional video
8(V)	3860	Occasional video / Horse Racing (digital)	6(H)	3820	Occasional video
9(H)	3880	Occasional video	7(V)	3840	Occasional video
10(V)	3900	Occasional video	8(H)	3860	ABC NewsOne Channel
11(H)	3920	Horse Racing (digital)	9(V)	3880	Occasional video
12(V)	3940	Horse Racing (digital)	10(H)	3900	Fox Network feeds (LEITCH) / 20th Century Fox Syndication
13(H)	3960	Horse Racing (digital)	11(V)	3920	LDS Television (digital)
14(V)	3980	Horse Racing (digital)	12(H)	3940	Occasional video
15(H)	4000	Occasional video	13(V)	3960	Fox Network - East (LEITCH) / 20th Century Fox Syndication
16(V)	4020	HBO Plus (East) (VC2+)	14(H)	3980	Occasional video
17(H)	4040	MoreMax (East) (VC2+)	15(V)	4000	Globecast feeds / Paramount Syndication / UPN Network (digital)
18(V)	4060	Occasional video	16(H)	4020	Occasional video / Paramount Syndication (occasional)
19(H)	4080	HBO Signature (East) (VC2+)	17(V)	4040	SCOLA (digital)
20(V)	4100	HBO Plus (West) (VC2+)	18(H)	4060	Armed Forces Radio and Television Service (digital)
21(H)	4120	Occasional video	19(V)	4080	America's Collectibles Network
22(V)	4140	Horse Racing (digital)	20(H)	4100	Occasional video
23(H)	4160	Occasional video	21(V)	4120	ABC Network - West (LEITCH)
24(V)	4180	Gem Shopping Network (digital) / Horse Racing (digital)	22(H)	4140	ABC Network - East (LEITCH)
			23(V)	4160	Occasional video
			24(H)	4180	Occasional video/North Carolina Open Public Events Network (occasional)

Panamsat Galaxy 3R - Ku-band

95 degrees West longitude		
T01(H)	11720	Data Transmissions
T02(V)	11750	Data Transmissions
T03(H)	11750	FM2 services
		Data transmissions .06, 2.93, 3.01, 3.07 and 3.15 MHz
T04(H)	11780	(none)
T05(V)	11810	Data Transmissions
T06(H)	11810	Data Transmissions
T07(H)	11840	Data Transmissions
T08(V)	11870	Data Transmissions
T09(H)	11870	(none)
T10(H)	11900	Data Transmissions
T11(V)	11930	Data Transmissions
T12(H)	11930	Occasional video / Channel 1 / STN: Student Television Network
T13(H)	11960	Data Transmissions
T14(V)	11990	Data Transmissions
T15(H)	11990	Data Transmissions
T16(H)	12020	FM2 services
T17(V)	12050	Data transmissions .06, .53, .47, .64, 1.95, 2.18, 2.45, 2.52, 2.82, 2.92, 3.20, 3.38, 3.73, 3.97, 4.14, and 4.24 MHz
T18(H)	12050	Occasional video / Data Transmissions
T19(H)	12080	Data Transmissions
T20(V)	12110	Data Transmissions
T21(H)	12110	(none)
T22(H)	12140	Data Transmissions
T23(V)	12170	Data Transmissions
T24(H)	12170	CCTV-4 China

97 degrees West longitude		
1(V)	3720	(none)
2(H)	3740	Data Transmissions
3(V)	3760	Occasional video
4(V)	3780	Occasional video

Loral Skynet Telstar 5 - Ku-Band

97 degrees West longitude		
1(V)	11728.5	Data Transmissions / Bob Jones University Homesat (digital)
2(H)	11735.0	Data Transmissions
3(V)	11789.5	Occasional video / Fox news feeds (digital)
4(H)	11796.0	Data Transmissions
5(V)	11836.0	Occasional video
6(H)	11842.5	Data Transmissions
7(V)	11867.0	Data Transmissions
8(H)	11873.5	DVB Globecast World Television services
9(V)	11898.0	DVB Palestine Satellite Channel, Dubai EDTV, Dubai Sports, BTVN-TV, Nile Variety Channel, Jordan Satellite Channel, Nile International, Saudi Channel 1
10(H)	11904.5	Data Transmissions
11(V)	11929.0	Occasional video
12(H)	11935.5	DVB Globecast World Television services
13(V)	11960.0	Data Transmissions
14(H)	11966.5	Data Transmissions
15(V)	11991.0	DVB Williams PAC Network services
16(H)	11997.5	Data Transmissions
17(V)	12022.0	Data Transmissions
18(H)	12028.5	Data Transmissions
19(V)	12053.0	Occasional video
20(H)	12059.5	Data Transmissions
21(V)	12084.0	DVB Taipei International Satellite Television services
22(H)	12090.5	DVB ABS-CBN International services
23(V)	12115.0	DVB C Sky Net services
24(H)	12121.5	Occasional video
25(V)	12146.0	Occasional video
26(H)	12152.5	DVB Globecast World Television services
27(V)	12177.0	DVB Varsity TV, Maharishi Open University, Thai TV 5, AFN Farsi Radio, VTV4, Haitian Satellite Television, Samanyolu TV World, Kuwait TV, TRT-TV, Israeli TV, Back to Health TV, WRN (also look for WRN under Globecast services)
28(H)	12183.0	Spacecom FM2/FM3/Hypercube Services
		Data Transmissions .046, .08, .15, .19, .23, .30, .35, .38, .50, .65, .89, .93, .96, 1.05, 1.12, 1.22, 1.35 MHz

9-11 Aftermath Monitoring

Harry Marnell in California posted the frequency list below to the *Fedcom* newsgroup shortly after the 9-11 terrorist attacks. Where there are two frequencies, the first is the repeater input, second is the repeater output.

FEMA HF Nationwide nets
5.711 MHz night and 10.493 MHz days (USB)

FEMA Urban Search & Rescue Cache

418.050	FEMA Command 1
406.450	FEMA SAR Team 1
415.950	FEMA SAR Team 1 Tactical 3
416.275	FEMA SAR Team 1 Tactical 4
407.125	FEMA SAR Team 2 Tactical 5
416.475	FEMA SAR Team 2 Tactical 6
416.725	FEMA SAR Team 3 Tactical 7

Federal Emergency Administrative Radio System FEARS

170.200/169.250	Los Angeles 1
173.800	San Pedro Hill Emergency
170.200/189.250	Los Angeles 2

San Pedro Hill Administration

143.000/142.425	San Francisco 3
-----------------	-----------------

Mount Tamalpais Administration

170.200/169.250	San Francisco 4
-----------------	-----------------

FEMA National Preparedness Directorate

140.025/143.000	Region 1 Boston repeaters 1
140.900	Boston Simplex 2
139.825/143.000	Region 2 New York repeaters 3
142.925	New York Simplex 4
139.950/143.250	Region 3 Philadelphia repeaters 5
142.925	Philadelphia Simplex 6
139.450/142.425	Region 4 Atlanta repeaters 7
142.400	Atlanta simplex 8 142.400
138.575/141.950	Region 5 Chicago repeaters 9
140.925	Chicago simplex 10 140.925
139.950/142.975	Region 6 Denton TX repeaters 11
143.625	Denton TX simplex 12
140.025/143.000	Region 7 Kansas City Missouri repeaters 13
140.900	Kansas City MO simplex 14
138.575/141.950	Region 8 Denver repeaters 15
140.925	Denver simplex 16
139.825/143.000	Region 9 San Francisco repeaters 17
142.375	San Francisco simplex 18
139.950/143.250	Region 10 Bothell WA repeaters 19
142.375	Bothell WA simplex 20

FEMA Siren Control Nationwide

173.1875	Siren Control 173.1875
----------	------------------------

◆ Post Office in the Milair Band?

Also in the aftermath of 9-11, Kevin O'Rourke passed along this interesting intercept by an unidentified member of the Chicago-area monitoring group (CARMA) on their listserver.

"I work at O'hare, and directly across the street from our place is the USPS Military and International facility. In the two days since the bombing, they had been blocking the entrances to the docks with cars and vans – US Government types, and I noticed a small mag mount antenna on the roofs of the vehicles. I got out my trusty PRO 43 and started to search the 200 MHz band. I got them using very low power on 229.675 MHz FM. Today, as I was leaving, I went up to one of the cars and asked the driver if he knew what freq he was using. Of course, he didn't know, so I showed him the scanner with the freq on it, and asked him to key up his microphone, which he did. This finally confirmed it for me. He found this so interesting that he also wrote down the frequency."

Has anyone previously seen reports of land mobile, narrowband FM use of the frequencies the UHF military air range? Anyone familiar with the radios the USPS might have been using in this range?

◆ Correction and Report

Popular Communications magazine's senior editor, Tom Kneitel, K2AES, found an error in my September 2001 *MT Fed File* column. We mentioned the U.S. Coast Guard facility at Governors Island, New York. Tom says this facility has been decommissioned. The island is abandoned and up for sale. It is being sought after by real estate developers for use as a park.

Tom also passes along the following Federal frequency intercepts from his neck of the woods.

164.9375	Active on Long Island, presumed by the Health and Human Services. Transport buses taking patients to medical facilities. Several bases, including one at Riverhead, New York. [My notes indicate this is a Veteran Administration net with KJN 946 in Brooklyn, KCB 576 in Northport, and KLM 555 in Saint Albans-LVH]
165.8375	Active in New York metro area. Unknown agency, fully scrambled (same scrambling method as U.S. Customs Service).
169.4500	U.S. Customs Service, New York metro area, clear and scrambled communications [Operation Alliance repeater output and simplex channel, input is 171.075 MHz-LVH]
172.2750	Active on Long Island by the New York State Dept of Environmental Conservation.

◆ Austin Federal Trunk Systems

MT feature writer John Mayson has discovered a new Motorola Astro federal trunk system in the Austin, Texas, area. Here is what is currently known about the system. If anyone has any additional information on this system please pass it along to the email address in the masthead.

System: Motorola Astro

Base/Offset Frequencies: 406.000 MHz/Offset: 25 kHz

Frequencies: 406.800 (control channel) 406.525 408.525 407.025 409.025

◆ Anaheim/Orange County Trunk System

Another regular *Fed Files* reporter, Chris Parris, has discovered a new trunk system in the Anaheim/Orange County, California, area. The data channel is on 406.425 MHz. This trunk system is a Motorola SmartZone with a system identification of 6a34. Trunk software indicated that the above frequency is part of site zero in this trunk network. He also notes little activity on the system with only one repeater in operation in addition to the data channel. Anyone know who this system belongs to?

◆ South Florida Customs Service

MT's Scanning Report columnist, Robert Wyman, passes along his comments on the loadout of U.S. Customs Service radio used in South Florida (See Table One).

Robert says, "The federal frequencies are still pretty good, although I don't have any current channel designations or interdiction program information. For example, channels listed as being 'BLOC' were used for the Blue Lightning Operations Center, one of the many specially-funded interdiction programs of the '80s and '90s. 'IC' channels are still good, as they are the Inspection and Control units at Ports of Entry like MIA and the Port of Miami.

"The other USCS channels for alternate repeaters and simplex operations are probably good enough to keep in a scanner, although actual usage may be different than the reserved uses illustrated on the list. Regular USCS monitors will recognize many of the simplex frequencies as being current.

"As for the interagency channels, certainly all the MDPD, BSO, FHP, Hialeah and Gables info have changed. Intercity is still a good channel, of course, as are all the INS, USSS, Marshals, Marine Channels and NOAA weather channels

that are illustrated. I found some numbers that are new to me, including a 'SURVL' freq in the 153s...Very interesting allocation there and one I guess I missed through the years!

"Also of interest are the inclusion of Business Band itinerant channels...just goes to show that the feds can hide anywhere! This list also illustrates another point: the new radios have enormous memories, just like other electronic/consumer products, and agencies like to 'fill 'em up' just because they can. Don't ever expect USCS or anyone else to come up on another agency's channels on a regular basis. For a raid or local emergency, perhaps, but rarely on a day-to-day, shift-to-shift basis. Most likely, USCS used to monitor the 'locals' on radios such as this while conducting other operations. That is, if USCS was in a neighborhood doing something, they'd probably monitor the local MDPD district just to know what's going on around them."

I would like to thank all our reporters this month – Tom Kneitel, Harry Marnell, John Mayson, Jack NeSmith, Kevin O'Rourke, Chris Parris and Robert Wyman. Until next month 73 and good hunting.

Table One: U.S. Customs Service Radio Loadout, S. Fla

TX Freq	RX Freq	PL Tone	Zone	Chan Name
Nationwide and Area Tactical				
165.2375	165.2375	100.0	1Z	A 1 SECTR [Sector-LVH]
166.4375	165.2375	100.0	1Z	A 2 SECTR
166.4625	166.4625	CSQ	A 3	TREAS [Treasury Common-LVH]
166.5875	166.5875	CSQ	A 4	FLSIM
166.200	166.200	CSQ	A 5	IC [South Florida only-LVH]
166.4875	165.2375	100.0	1Z	A 6 ALT R [Backup repeater at Brickell-LVH]
164.9625	164.9625	100.0	1Z	A 7 ALT S [Also repeater out/in 166.300-LVH]
169.550	166.5875	100.0	1Z	A 8 TAC 1
164.775	164.775	100.0	1Z	A 9 BLOCS [Blue Lighting Ops Simplex-LVH]
165.975	164.775	100.0	1Z	A 10 BLOCR [Blue Lighting Ops Repeater-LVH]
158.835	155.985	103.5	1A	A 11 HQ
Blank	162.550	CSQ	A 12	WX 1 [NOAA Weather-LVH]

Operation Alliance and Civilian LE

164.775	164.775	100.0	1Z	B 1 BLOC [Blue Lighting Ops-LVH]
165.975	164.775	100.0	1Z	B 2 BLOC
158.910	155.970	103.5	1A	B 3 MDTAC
158.940	154.115	103.5	1A	B 4 MD PD
158.790	156.090	131.8	3B	B 5 CG PD
155.370	155.370	CSQ	B 6	CITY1
155.475	155.475	CSQ	B 7	CITY2
164.300	165.5125	100.0	1Z	B 8 GLNCO [Glynco LE Training-LVH]
169.450	169.450	100.0	1Z	B 9 CARIB [Operation Alliance-LVH]
171.075	169.450	100.0	1Z	B 10 CARIB [Operation Alliance-LVH]

166.5875 165.2375 100.0 1Z B 11 PRALT [Puerto Rico USCS repeater-LVH]

USCS District and Secret Service

166.200	166.200	100.0	1Z	C 1 IC
165.4125	166.200	100.0	1Z	C 2 IC
165.2375	165.2375	100.0	1Z	C 3 SETOR
166.4375	165.2375	100.0	1Z	C 4 SETOR
166.4875	165.2375	100.0	1Z	C 5 ALT R
164.775	164.775	100.0	1Z	C 6 BLOCS
165.975	164.775	100.0	1Z	C 7 BLOCR
165.7875	165.7875	CSQ	C 8	USSS1
165.375	165.375	CSQ	C 9	USSS2
165.2125	165.2125	CSQ	C 10	USSS3
166.400	165.375	CSQ	C 11	USSS4
164.9875	165.7875	CSQ	C 12	USSS5

Civilian Law Enforcement

155.655	155.655	103.5	1A	H 1 LOCAL
159.090	155.700	103.5	1A	H 2 DORAL
166.4375	165.2375	100.0	1Z	H 3 SECTR
155.895	155.895	103.5	1A	H 4 16 B4
154.085	154.085	103.5	1A	H 5 15 B3
158.955	155.880	103.5	1A	H 6 MAP
153.750	153.750	100.0	1Z	H 7 SURVL
159.030	155.790	103.5	1A	H 8 RECDs
158.910	155.970	103.5	1A	H 9 TACTL
Blank	167.35625	CSQ	H	10 AID
154.570	154.570	82.5	YZ	H 11 MSSH
155.100	155.100	CSQ	H	12 PB WK

Civilian Law Enforcement

155.250	154.710	179.9	6B	G 1 BSO 1
155.415	154.740	179.9	6B	G 2 BSO 2
155.640	154.950	179.9	6B	G 3 BSO 3
155.685	155.130	179.9	6B	G 4 BSO 4
155.670	155.070	179.9	6B	G 5 BSO 5
155.535	154.800	179.9	6B	G 6 BSO 6
155.595	154.860	179.9	6B	G 7 BSO 7
155.625	154.890	179.9	6B	G 8 BSO 8
154.950	154.950	179.9	6B	G 9 BSO 9
155.070	155.070	179.9	6B	G 10 BSO10
151.625	151.625	CSQ	G	11 RANG1
154.570	154.570	CSQ	G	12 RANG2

Civilian Law Enforcement and INS

155.490	154.725	110.9	2Z	H 1 MCS01
155.430	154.725	110.9	2Z	H 2 MCS02
155.520	154.785	156.7	5A	H 3 MCS03
154.650	154.650	110.9	2Z	H 4 MCS05
156.150	158.925	110.9	2Z	H 5 MCS06
163.650	163.650	CSQ	H	6 KROME
162.950	163.750	123.0	3Z	H 7 K 236
162.925	163.625	100.0	1Z	H 8 USBP
162.925	163.675	123.0	3Z	H 9 INSA
163.725	163.725	CSQ	H	10 INS 5
159.150	155.010	103.5	1A	H 11 HMST2
156.075	151.070	103.5	1A	H 12 HMSTD

Civilian Law Enforcement

155.490	154.725	110.9	2Z	PD 1 KW SO
155.430	154.755	110.9	2Z	PD 2 KV SO
155.520	154.785	156.7	5A	PD 3 PK SO
155.370	155.370	110.9	2Z	PD 4 INCTY
154.650	154.650	110.9	2Z	PD 5 CTOC
155.490	156.150	110.9	2Z	PD 6 COJOE
155.550	154.815	110.9	2Z	PD 7 KW PD
155.505	154.665	186.2	7Z	PD 8 HP 1
155.445	154.680	186.2	7Z	PD 9 HP 2
155.580	154.680	186.2	7Z	PD 10 HP 2A
155.460	154.695	186.2	7Z	PD 11 HP 3
154.920	154.920	186.2	7Z	PD 12 HP 4

VHF Marine Frequencies

156.300	156.300	CSQ	MARINE	1 CH 6
156.450	156.450	CSQ	MARINE	2 CH 9
156.500	156.500	CSQ	MARINE	3 CH 10
156.550	156.550	CSQ	MARINE	4 CH 11
156.600	156.600	CSQ	MARINE	5 CH 12
156.800	156.800	CSQ	MARINE	6 CH 16
156.900	156.900	CSQ	MARINE	7 CH 18
157.100	157.100	CSQ	MARINE	8 CH 22
156.425	156.425	CSQ	MARINE	9 CH 68
156.575	156.575	CSQ	MARINE	10 CH 71
156.625	156.625	CSQ	MARINE	11 CH 72
156.925	156.925	CSQ	MARINE	12 CH 78

TRACKING THE TRUNKS

TECHNOLOGY, EQUIPMENT, FREQUENCIES AND NEWS

Dan Veeneman

dan@signalharbor.com

Encryption for Security

Most Americans are much more security conscious now than they were before the terrorist attacks on September 11, 2000. A number of new laws have been passed in the wake of the attacks, many geared toward giving government agencies further latitude in pursuing persons suspected of criminal activity. In such an environment it shouldn't be a surprise that the following message appeared in Internet news groups:

The National Security Council and the FCC quietly asked Uniden to cease production of an APCO 25 digital scanner for the time being. The National Security Council cited security issues in the request due to the fact that many military and police agencies, border patrol and INS are unencrypted APCO 25. Uniden representatives will not even discuss the issue for fear that the NSC might also pressure Uniden to halt production of the BC-780...

By way of background, in early 2001 Uniden reported that they were working on a scanner that could monitor the digital voice transmissions from APCO 25 radios. Although Uniden's intended use for such a device is the legal monitoring of public safety agencies, many federal police and some military units also use APCO 25 equipment. Since no such scanner is currently available to the public, APCO 25 users have a modicum of privacy from the casual listener. (It should be noted that a dedicated hobbyist could monitor APCO 25 signals for well under \$2000, a small amount of money even for a poorly funded terrorist organization.)

In response to this note and numerous requests, Uniden issued this statement:

Uniden America Corporation is developing an APCO 25 digital scanner model, which is slated for distribution in the fourth quarter of 2002. To date, and contrary to industry rumor, Uniden has received no requests from the FCC or any federal, state, or local authority asking the company to delay or halt development of this or any other Uniden product.

It is important that the public understand the nature of APCO 25 scanner technology, which allows users to pick up ordinary digital signals such as those now used by police and emergency officials in a few large US cities including, for example, Los Angeles. Scanners such as the APCO 25 model in development by Uniden do not facilitate

the decoding of any encrypted transmissions including transmissions by national security and law enforcement authorities such as the CIA, DEA and U.S. Special Forces Units.

Uniden at this time does not anticipate receiving any requests to alter its product-development schedule on any APCO 25 digital scanner units.

Jennifer Ainsworth
Media & Trade Show Manager
Uniden America Corporation
4700 Amon Carter Blvd.
Fort Worth, TX 76155

◆ Encoding Versus Encryption

While it is generally against federal law in the United States to monitor *encrypted* transmissions, at the moment it remains legal to monitor most *encoded* signals (some signals are strictly off-limits regardless of their characteristics – for example, anything in the cellular telephone frequency bands is forbidden).

At first blush, encoded and encrypted signals sound the same coming from an ordinary scanner. You may have heard the harsh grinding or "hash" noise from an open squelch when tuned to a digital signal, such as the control channel of a trunked radio system. Not all digital signals sound the same, of course, but no one can tell by ear whether an APCO 25 transmission, for instance, carries voice that has been encrypted. The only way to find out is to *decode* the transmission as far as possible and see if what remains is encrypted or not.

A code is simply a way of representing something, and all digital messages transmitted over radio use some kind of *encoding*.

Digital implies that the message is made up of a sequence of binary 1's and 0's, and the way in which that sequence is transmitted is the encoding method. Some code representations are very simple, such as the signal from your garage door opener, and some are rather complex, such as APCO 25.

Newer garage door openers have a "security setting" that is encoded in the transmission from your car to the garage. The transmission itself is a representation of the security setting. The receiver inside the garage *decodes* the transmission, translating the representation back into the security setting. Encoding and decoding are necessary to get the message from the transmitter to the receiver in a reliable and efficient manner. There is nothing hidden or secret going on, so all of this is separate and distinct from encryption.

APCO 25 messages are much more complicated than garage door opener signals, but at a fundamental level they follow the same process. The message to be sent, a snippet of digitized voice, is wrapped with error correction and signaling information before being transmitted. At the receiver, the signaling information is peeled off and the error correction data is used to eliminate the effects of any interference that may have occurred. The result is the original digitized voice, which was encoded but never encrypted, and should be legal to monitor.

Of course, the owner of an APCO 25 system may choose to encrypt the snippets of digitized voice within the encoded transmission. This adds cost and complexity to each radio but in many systems is already in place for sensitive talkgroups such as detectives and SWAT teams. In these cases the hobbyist listener is out of luck.

Standard Voice Frame



Encrypted Voice Frame



◆ Encrypted Voice

APCO 25 isn't the first type of system to have encryption.

Many early systems offered a cheap, easily defeated analog method known as voice inversion scrambling. In this scheme the band of audio frequencies used for human speech is split into two parts, a lower block and an upper block. The blocks are inverted before transmission and inverted once again (restoring the original arrangement) at the receiver. Anyone overhearing the transmission just hears the "Donald Duck" noises as the user speaks. Both hardware and computer software to undo this type of scrambling are available to hobbyists these days, and it is even possible (with practice) to understand inverted speech with no mechanical aids at all.

◆ Motorola Voice Encryption

Since the 1970s Motorola has offered digital voice encryption on their two-way radio products, either built-in or as an add-on device. The first capability was termed Digital Voice Privacy (DVP), which at the time was intended to provide a basic level of privacy for businesses and local governments. The method of encryption used in DVP is based on a proprietary algorithm kept secret within Motorola. It uses a 32-bit key, which these days doesn't provide much protection.

For a higher level of security the DVP algorithm could be replaced by the Data Encryption Standard (DES), which follows the federal standard put out by the National Bureau of Standards (now the National Institute of Standards and Technology, or NIST). DES is a well-known and publicly available algorithm that uses a 56-bit key, although for modern uses it has recently been replaced by the Advanced Encryption Standard (AES).

These two early capabilities, DVP and DES, suffered from a smaller geographic operating range than the analog voice product, meaning that if you wanted DVP or DES you had to be closer to the repeater (or you needed more repeaters) than if you were using an analog radio. In the early 1980s a technical report was issued by the Federal Bureau of Investigation that indicated the range loss for the DVP and DES products would require nearly double the number of repeaters to match the coverage area of an equivalent analog system.

In response to this and other complaints, Motorola introduced the XL modifications to each of the DVP and DES products. They also produced the Digital Voice International (DVI), which was designed for export outside of the United States and was much weaker than the domestic privacy systems.

To summarize, the five voice privacy offerings for standard Motorola radios are DES, DES-XL, DVP, DVP-XL and DVI-XL. Remember that no matter which product might be in use, the control channel of a Type I or Type II trunked system remains unencrypted and can be monitored.

◆ EDACS Voice Encryption

Enhanced Digital Access Communications System (EDACS) is a trunking system originally developed by General Electric. Technically, EDACS itself is a radio trunking format capable of supporting several types of digital voice traffic in addition to analog. Some systems may even have a mix of different voice transmissions on the same system as users upgrade from older radios to newer digital units.

The first generation, from the mid-1980s, is termed Voice Guard and uses either DES encryption or a proprietary algorithm called VGE.

The second generation from the early 1990s has much better voice quality and is called AEGIS. Again, either DES or VGE could be used as the encryption algorithm, or AEGIS could be run with no encryption at all. Although running without encryption doesn't provide any additional protection, the mere fact that it is digital prevents scanner listeners from overhearing conversations.

The current generation, called ProVoice, has even better voice quality than AEGIS and can either be encrypted with VGE or DES, or run unencrypted.

Results from GE's digital voice systems show that their range is farther than analog voice, due primarily to the error detection and correction methods in use.

◆ On-Line Scanner Manuals

I have a Radio Shack PRO-35 scanner that works fine but I lost the manual. Do you have any idea where I can find the instructions or a user guide for it?

Thanks, Ray

If you've picked up a scanner at a hamfest or flea market, it probably came without a user manual. Fortunately, the Internet is a good resource to locate information about that "vintage" receiver.

Radio Shack has support information for more than 100 scanners on their website, including all of their trunk-tracking units. You can find the master index at support.radioshack.com/support_electronics/2849.htm

Besides having manuals for all three variants of the PRO-92 (200-0522, 200-0522A and 200-0522B), they even have documentation going as far back as the crystal-controlled PRO-20.

The Hobby Radio Stop in Ohio offers numerous manuals from a variety of manufacturers, including one of my favorite old handhelds, the Bearcat 200XL. The website can be found at www.bearcat1.com/owner.htm.

◆ Tallahassee, Florida

The Tallahassee Fire Department responds to fire, rescue, and medical calls in and around the Tallahassee, Florida area. Over the last few years, the City of Tallahassee has instituted an 800 MHz Trunking System Motorola Type II-i), with the Fire Department as a regular user. The 800 system

was built for coverage across Leon County, as the TFD is the primary countywide fire department. Volunteer Fire Departments dot the county's landscape, with some responding just inside the city limits.

I enjoy listening to the TFD on 154.190, as well as talkgroup 1200 (Dispatch). With my PRO-92, I set the VHF simulcast as my priority channel and then I am free to listen to other public safety agencies on 800 MHz. The 800 system is growing, due to Florida Highway Patrol having talkgroups on the system, as well as the recent addition of the Leon County Sheriff's Department (requiring more frequencies).

Anyway, I just finished reading your article on simulcasting and thought I would add my thoughts.

Jay from Florida

Thanks for writing, Jay. I'm interested in hearing from other readers who are listening to simulcasts of systems that are currently or will be going digital.

That's all for this month. I welcome your electronic mail at dan@signalharbor.com, and as always more information is available on my website at <http://www.signalharbor.com>. Until next month, happy monitoring!

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

Full 800 MHz Scanners

 AOR AR-8200MKII Wideband portable receiver - 0.5 to 2040 MHz continuous. (unlocked) - NFM, WFM, NAM, WAM, USB, LSB & CW - Alphanumeric memory identification - Spectrum scan - Computer control - Flexible dynamic memory - Optional CTCSS & Extra memory boards	 ALINCO DJ-X2 Credit Card Wideband portable receiver - 0.5 to 999 MHz continuous. (unlocked) - NFM, WFM, AM - 700 memory channels - Lithium Ion Battery - RF detector (Bug finder) - Menu system - Weighs 7 oz, 15mm thin, SMA connector	 ICOM IC-R3 (unlocked) "Portable receiver with built-in TV receiver!" - Modes of operation AM, FM, WFM, AM - Wide frequency coverage, 0.5 to 2450 MHz. - 450 memory ch, 6 character alphanumeric - TV picture receive capability, NTSC, M, PAL B/G	OPTOELECTRONICS YUPITERU Guaranteed Delivery to USA. www.Radioworld.ca Phone: 416-667-1000 FAX : (416) 667-9995 sales@radioworld.ca 4335 Steeles Ave. W., Toronto, ON Canada M3N 1V7
--	--	--	---

Military Callsigns and More

◆ Florida Cruise Missile Launch

Veteran Milcom reporter Allan Stern recently monitored a cruise missile launch down in Florida. The missile was sea launched from off the Florida east coast to a target at Eglin AFB, Florida.

Stern heard this activity on UHF 254.2 MHz (AM mode), identified as Tac-1, which is normally a Miami ARTCC frequency. Stations monitored during this mission included:

Astro 80	U.S. Air Force KC-135 tanker from Fairchild AFB, Washington (Refueling comms heard on 296.850 MHz)
Bravery	Possibly the ship which launched the cruise missile
Mike-7	Ground Station at Tyndall AFB, Florida, aka Oakgrove (NORAD).
Ribby 5#	F-15 C Chase aircraft from Tyndall AFB
Widget ##	DHC-8 support aircraft from Tyndall AFB

Other callsigns heard during the mission included: Quebec 08, Quebec Charlie, Romeo Mike 20, and Sierra 7 November. Allan also reported a new discrete E-8C JStars aircraft frequency on 235.250 MHz. Thanks for the report, Allan.

In addition to the frequency above, here are some of the other JStars discrete frequencies I have in my database:

HF:	13204.0 13909.0 kHz
VHF:	123.200 MHz
UHF:	225.575 227.925 228.225 228.975 231.750 238.350 250.900 (Tentative) 271.100 276.050 308.850 313.650 345.000 351.025 380.850 382.600 MHz

◆ Vandenberg Spy Satellite Launch

Our veteran west coast reporter Mark Zurovski was monitoring a National Reconnaissance Office (NRO) Titan IV satellite launch in October and reported a new discrete frequency for callsign Frontier (30th Space Wing Command Post at Vandenberg AFB, California).

During the launch Mark caught Frontier working Bloundhound 335 (a NP-3 aircraft from Point Mugu) on 349.300 MHz about range issues. He also noted a King Air flight out of Santa Maria doing real time weather reconnaissance on 132.750 MHz. This was directly conflicting with callsign Sport Control out of Edwards AFB heard on the same frequency. Mark also reports that 390.750 MHz was silent again for this launch. This frequency has had some unidentified data activity on it in the past.

Here is my list of Frontier Control frequencies from the *Grove Military Frequency Directory*:

121.400	127.650	156.300 (VHF Marine Range Safety/Clearance)
156.425	156.600	156.800 157.100 256.000 266.600
280.800	286.400	296.500 304.900 336.000 349.100
349.300	351.300	357.150 384.800 386.600

Other milair frequencies used at Vandenberg AFB (KVBG) include:

119.050	Approach/Departure Service (Los Angeles ARTCC via San Luis Obispo Remote)
121.750	Ground Control/Clearance Delivery
124.950	Tower
126.200	Pilot-to-Dispatcher
133.875	AWOS-3
269.500	Approach/Departure Service (Los Angeles ARTCC via San Luis Obispo Remote)
275.800	Ground Control/Clearance Delivery
311.000	Command Post (Callsign Spaceport)
321.000	Command Post (Callsign Spaceport)
326.200	Tower
342.400	PMSV
372.200	Pilot-to-Dispatcher

◆ Tyndall AFB Frequency Changes

Speaking of Tyndall Air Force Base, the following new frequencies are now in use:

139.900	VHF Pilot-to-Dispatcher
228.000	Compass Lake MOA Monitor
254.400	ATIS
255.900	Carabelle MOA Monitor
259.300	Ground Control
290.625	PMSV
290.800	IATF
318.200	RAPCON Discrete
354.150	RAPCON Discrete
381.300	Command Post
388.200	Departure Control

◆ Metaphor HF Frequencies

The Air Mobility Command at Ramstein AB, Germany, has been very active during Operation Enduring Freedom. Another of our Florida reporters, Jack (the Grunt) NeSmith passed along the following NOTAM regarding this station:

AIR/GROUND FACILITY CHANGED BANN-B HF STATION (CALL SIGN: METAPHOR) PROVIDES HF VOICE FREQUENCY SUPPORT TO ALL US AIRCREWS, GROUND STATIONS, ON 6730 KHZ AND 9022 KHZ. HOURS OF OPERATION ARE 0500 - 2100Z DAILY. PHONE PATCH SUPPORT WILL BE SUPPORTED AS WELL.

Jack also caught the following information regarding the RAF Cyprus station supporting the U.S. Air Force Global HF System (GHFS) network comms:

AIR/GROUND FACILITY CHANGED EFFECTIVE IMMEDIATELY, CYPRUS FLIGHTWATCH WILL PROVIDE HF VOICE FREQUENCY SUPPORT TO ALL US AIRCREWS, GROUND STATIONS, AND SHIPS IN SUPPORT OF OPERATION ENDURING FREEDOM ON 8992 MHZ AND 11175 MHZ UNTIL FURTHER NOTICE. CYPRUS FLIGHTWATCH WILL BROADCAST HF ADVISORY TRAFFIC VIA 8992 MHZ, 11175 MHZ, AND 11244 MHZ WHEN REQUIRED BY THE APPROPRIATE RECONNAISSANCE OPERATIONS CENTER. PHONE PATCH SUPPORT WILL BE SUPPORTED AS WELL.

And if anyone was wondering whether the Combat Air Patrol missions being flown over the cities of the United States aren't serious, check out this NOTAM warning:

SPECIAL NOTICE ... RESTRICTED/PROHIBITED AREA ENFORCEMENT EFFECTIVE IMMEDIATELY, COMMERCIAL AND PRIVATE AIRCRAFT FLYING INSIDE, OR IN CLOSE PROXIMITY TO, NEWLY ESTABLISHED OR CURRENTLY EXISTING RESTRICTED OR PROHIBITED AREAS OF THE UNITED STATES WILL BE SUBJECT TO BEING FORCED DOWN BY ARMED MILITARY AIRCRAFT. IF NECESSARY, THE MILITARY HAS INDICATED THAT DEADLY FORCE WILL BE USED TO PROTECT THESE AREAS FROM UNAUTHORIZED INCURSIONS. THESE MEASURES ARE NECESSARY IN RESPONSE TO THE TERRORIST ATROCITIES OF SEPT 11, 2001, WHICH CAUSED THOUSANDS OF INNOCENT CIVILIAN CASUALTIES. THE MILITARY WILL USE DEADLY FORCE ONLY AS A LAST RESORT, AFTER ALL OTHER MEANS ARE EXHAUSTED. THIS NEW POLICY IS IN EFFECT UNTIL FURTHER NOTICE. OFFICIAL CHARTS OUTLINING THE NEW RESTRICTED OR PROHIBITED AREAS WILL BE MADE AVAILABLE AS SOON AS POSSIBLE. THESE AREAS WILL BE PERIODICALLY REVISED AND WILL THEREFORE REQUIRE THAT EACH PILOT RECEIVE AN UP TO DATE BRIEFING ON THE STATUS OF THESE AREAS PRIOR TO EVERY FLIGHT. IN ADDITION, ALL AIRCRAFT OPERATING IN THE U.S. NATIONAL AIRSPACE AND IN CLOSE PROXIMITY TO THE SUBJECT AREAS, IF CAPABLE, WILL MAINTAIN A LISTENING WATCH ON VHF GUARD 121.5 OR UHF 243.0. IT IS INCUMBENT ON ALL AVIATORS TO KNOW AND UNDERSTAND THEIR RESPONSIBILITIES IF INTERCEPTED. REVIEW AERONAUTICAL INFORMATION MANUAL SECTION 6, 5-6-2 FOR INTERCEPT PROCEDURES.

◆ Pacific Northwest Government Trunk Systems

Chris Parris has noted a change in the Fort Lewis, Washington, trunk system. The last time he monitored the system, they were only using six frequencies. During a recent monitoring session Chris noted 11 frequencies in use.

Ft. Lewis, WA — Motorola Type II UHF
System ID - 3b38
Frequencies: 406.125 406.950 407.125 407.250 407.300
407.475 408.100 408.550 409.150 409.350 410.150

Chris notes that the 410.150 frequency shows up as a part of the trunked system, but it doesn't get used in the normal rotation of repeaters for radio traffic and only seems to carry phone patches. Parris has also found a Motorola Astro trunk system in the Seattle area.

Seattle Federal Trunk System — Motorola Astro
Base/Offset Frequencies: 406.000 MHz/25 kHz.
System ID - 711E
System Frequencies: 406.625 406.775 407.350 407.600
408.000 408.200 408.350

Does anyone in the Pacific Northwest have a positive identification on this system? Could this possibly be a portion of the military trunk system setup by the Navy in the Puget Sound area?

◆ Havoc on HF

Matt Cawby, who also resides in the Pacific Northwest, recently caught a couple of Havoc callsigns (Probably 7th Bomb Wing, Dyess AFB, Texas, C-130 aircraft) on the HF bands. He monitored them with casual chit chat on 7772.0, 7919.0, and 13110.0 kHz (all Upper Sideband USB). It is interesting to note that 7919.0 kHz is a known Air Mobility Command Post discrete and also used nationwide for the Tactical Air Control System support.

Matt also reported that Aegis 10/20 were utilizing the drop zone at Fort Lewis, Washington, for training and he caught their communications on 314.200 MHz. This is a known 7th Bomb Wing C-130 tactical airlift air-to-air frequency.

◆ Military Callsign List

Table one is a list of military callsigns that have been recently reported and identified by our readers. Reporters this time around are Allan Stern, Mike Heightchew, Roland, McCormick, Sandy in Denver, and your editor.

And that will do it for this edition of *The Milcom Report*. Until next month, 73 and good hunting.

Table One: Military Callsigns

Avalon ##	USAF C-9A aircraft, Scott AFB, Illinois
Basco ##	USAF C-17, Charleston AFB, South Carolina
Berry 540	USAF Contractor SW-4
Blade ##	USMC F/A-18A, VMFA-115
Dawg ##	USAF C-130H, 165AW Georgia ANG, Dobbins AFB, Georgia
Dolphin ##	US Navy VFA-203 Blue Dolphins, NAS Atlanta, Georgia

Doom ##	USAF B-52H Barksdale AFB, Louisiana	NNNONJI	B CO 1ST BN 3RD SFG(A)-ODA 322
FAB ##	Bolivian Air Force C-130	NNNONJJ	B CO 1ST BN 3RD SFG(A)-ODA 323
Fang ##	USAF F-15A Florida ANG	NNNONJK	B CO 1ST BN 3RD SFG(A)-ODA 324
Fiddle	US Navy TSC NAS Jacksonville, Florida	NNNONJL	B CO 1ST BN 3RD SFG(A)-ODA 325
Foxy ##	USAF T-38A Sheppard AFB, Texas	NNNONJM	A CO 2ND BN 3RD SFG(A)-AOB 340
Goldenhawk	US Navy TSC NAS Brunswick, Maine	NNNONJN	A CO 2ND BN 3RD SFG(A)-ODA 341
Hawk ##	USMC F/A-18D VMFA (AW)-533	NNNONJO	A CO 2ND BN 3RD SFG(A)-ODA 342
Jaguar 01	C-130 aircraft	NNNONJP	A CO 2ND BN 3RD SFG(A)-ODA 343
Jolly 11/21	USAF HH-60G USAF Pave Hawk Helicopter	NNNONJQ	A CO 2ND BN 3RD SFG(A)-ODA 344
JOSA 418	USAF C-21A Colorado ANG	NNNONJR	A CO 2ND BN 3RD SFG(A)-ODA 345
King 33	USAF C-130N #69-5833, 920 th RQS/39th RQS	NNNONJS	B CO 2ND BN 3RD SFG(A)-AOB 350
	Patrick AFB, Florida	NNNONJT	B CO 2ND BN 3RD SFG(A)-ODA 351
Mace ##	USAFF F-16 South Carolina ANG	NNNONJU	B CO 2ND BN 3RD SFG(A)-ODA 352
Magic ##	NATO E-3 AWACS aircraft	NNNONJV	B CO 2ND BN 3RD SFG(A)-ODA 353
Misty ##	US Navy S-3B, VS-41, NAS North Island, CA	NNNONJW	B CO 2ND BN 3RD SFG(A)-ODA 354
Mojo ##	C-21A aircraft	NNNONJX	B CO 2ND BN 3RD SFG(A)-ODA 355
N72472	US Customs Service A-200 Beechcraft KingAir, Air Interdiction Division, Oklahoma City, OK	NNNONEA	C CO 2ND BN 3RD SFG(A)-AOB 360
NASA 03	NASA Gulfstream I (G-159), Marshall Space Flight Center, Alabama	NNNONEB	C CO 2ND BN 3RD SFG(A)-ODA 361
NASA 910	NASA T-38N #66-10352 Johnson Space Flight Center, Texas	NNNONEC	C CO 2ND BN 3RD SFG(A)-ODA 362
NASA 915	NASA T-38N #60-0585 Johnson Space Flight Center, Texas	NNNONEF	C CO 2ND BN 3RD SFG(A)-ODA 363
NASA 919	NASA T-38N #66-8385 Johnson Space Flight Center, Texas	NNNONEG	A CO 3RD BN 3RD SFG(A)-ODA 365
NASA 948	NASA Gulfstream II (G-1159) Johnson Space Flight Center, Texas	NNNONEH	A CO 3RD BN 3RD SFG(A)-ODA 370
NASA 966	NASA T-38N #66-10357 Johnson Space Flight Center, Texas	NNNONEI	A CO 3RD BN 3RD SFG(A)-ODA 372
Navy JV-180	C-9B VR-58 NAS Jacksonville, Florida	NNNONEJ	A CO 3RD BN 3RD SFG(A)-ODA 373
Navy LF 64	US Navy P-3C Orion, VP-16 NAS Jacksonville, Florida	NNNONEK	A CO 3RD BN 3RD SFG(A)-ODA 374
Navy YD ## ##	US Navy P-3C Orion, VP-4 MCAS Kaneohe, Hawaii	NNNONEL	A CO 3RD BN 3RD SFG(A)-ODA 375
Nickel ##	USMC F/A-18A VMFA-122	NNNONEM	B CO 3RD BN 3RD SFG(A)-AOB 380
PAT 131	U.S. Army C-23 Fresno, California	NNNONEN	B CO 3RD BN 3RD SFG(A)-ODA 381
Pelican 7 ##	P-3C Orion, VP-45 NAS Jacksonville, Florida	NNNONEO	B CO 3RD BN 3RD SFG(A)-ODA 382
Phoenix 96	USAF contractor LJ-35 Learjet, Flight International	NNNONEP	B CO 3RD BN 3RD SFG(A)-ODA 383
Puget #	US Navy EA-6B, VAQ-129 NAS Whidbey Island, Washington	NNNONEQ	B CO 3RD BN 3RD SFG(A)-ODA 384
Razor ##	USAF E-8C Jstars (Front-end callsign)	NNNONER	B CO 3RD BN 3RD SFG(A)-ODA 385
Reach JHL3/4	USAF contractor DC-8 Air Transport International	NNNONEF	C CO 3RD BN 3RD SFG(A)-AOB 390
Redeye 01	USAF F-16 aircraft Buckley ANGB, Colorado	NNNONET	C CO 3RD BN 3RD SFG(A)-ODA 391
Rocket 251	US Navy T-2C VT-86 NAS Pensacola, Florida	NNNONEU	C CO 3RD BN 3RD SFG(A)-ODA 392
Rocket 504	US Navy T-39G VT-86 NAS Pensacola, Florida	NNNONEV	C CO 3RD BN 3RD SFG(A)-ODA 393
Search 03	NASA-KSC UH-1 Helicopter	NNNONEW	C CO 3RD BN 3RD SFG(A)-ODA 394
Smoky 06	USAF C-21A 84ALF Peterson AFB, Colorado	NNNONEX	C CO 3RD BN 3RD SFG(A)-ODA 395
Stealth	USAF 117 ACS Georgia ANG Ground Controller		
Strike ##	US Navy F-14 NAS Fallon, Nevada		
Strikestar	USAF E-8C Jstars (back-end mission callsign)		
Stinger #	934ACW/16ACCS Robins AFB, Georgia		
Utah ##	US Navy EA-6B, VAQ-140, NAS Whidbey Island, Washington		
Warcat #	USAF KC-135 151ARW, Salt Lake City IAP, Utah		
Zapper ##	US Navy EA-6B, VAQ-139, NAS Whidbey Island, Washington		
	USAF EC-130H, 41ECS Davis Monthan AFB, Arizona		

U.S. Navy MARS callsigns

assigned to deployed US Army Special from Fort Bragg, North Carolina.

NNNONAT	3RD SFG(A) COMMUNICATIONS CENTER -BOPP
NNNONAW	1ST BN 3RD SFG(A)-FOB 31
NNNONAX	2ND BN 3RD SFG(A)-FOB 32
NNNONAY	3RD BN 3RD SFG(A)-FOB 33
NNNONJA	A CO 1ST BN 3RD SFG(A)-AOB 310
NNNONJB	A CO 1ST BN 3RD SFG(A)-ODA 311
NNNONJC	A CO 1ST BN 3RD SFG(A)-ODA 312
NNNONJD	A CO 1ST BN 3RD SFG(A)-ODA 313
NNNONJE	A CO 1ST BN 3RD SFG(A)-ODA 314
NNNONJF	A CO 1ST BN 3RD SFG(A)-ODA 315
NNNONJG	B CO 1ST BN 3RD SFG(A)-AOB 320
NNNONJH	B CO 1ST BN 3RD SFG(A)-ODA 321

* 5.3ft solid 6-panel C/Ku dish, polar mount, add Hq18 and scan 120 azimuth.
\$150 + \$80SH (Ku holder \$25 extra)

* 4.5ft solid 6 panel C/Ku dish, patio mount, fixed satellite.
\$80 + \$50SH (ku LNB 23mm holder \$25 extra)

* Digital C-LNB 20 deg NF + scalar ring, \$49 + \$10SH

* SuperJack 18" actuator for 5.3ft, Hq18, \$59 + \$20SH

* Integro IT910s hdvr stb \$899 + \$25SH

Email: support@smallear.com or fax 888-7311834

www.DVBEXPRESS.COM

 Antenna Designer
New Version 2.1 for Microsoft Windows 95 and 98
Computer program helps you design and build
17 different antennas from common materials.
Based on Antenna Handbook by W. Clem Smith.

Only \$39.95

Send check or money order to:
Small Planet Systems
623 Mangels Avenue
San Francisco, CA 94127

www.smallplanetsystems.com 415-337-9394

 * 5.3ft solid 6-panel C/Ku dish, polar mount, add Hq18 and scan 120 azimuth.
\$150 + \$80SH (Ku holder \$25 extra)
* 4.5ft solid 6 panel C/Ku dish, patio mount, fixed satellite.
\$80 + \$50SH (ku LNB 23mm holder \$25 extra)
* Digital C-LNB 20 deg NF + scalar ring, \$49 + \$10SH
* SuperJack 18" actuator for 5.3ft, Hq18, \$59 + \$20SH
* Integro IT910s hdvr stb \$899 + \$25SH
Email: support@smallear.com or fax 888-7311834
www.DVBEXPRESS.COM

Domestic-band radio in Afghanistan

The events of September 11 have caused many of us to pay extra attention to Southwest Asia, and especially Afghanistan. The story of domestic-band broadcasting in Afghanistan is a short one, but there are other interesting things going on in that part of the world.

According to the 2001 *World Radio-TV Handbook* (WRTH), only four domestic-band transmitters exist in this troubled country. Transmitters on 657 and 1107 kHz near Kabul broadcast to an audience within Afghanistan; transmitters on 1278 and 1600 kHz at the same site broadcast in English and Urdu to adjacent countries. In fact, DXers believe 1107 kHz was the only of these frequencies operating before the attacks, though another unlisted transmitter was reported operating on 864 kHz in another part of the country. WRTH lists ten TV transmitters scattered throughout the country, but it's widely reported in the media that the Taliban government has banned television and the stations are no longer operating.

In any case, broadcast transmitters have long been a priority target of U.S. and NATO air attacks. Gun camera video showing the destruction of a Kabul transmitter site has been widely shown on American TV. No specific information has been released, but one can probably assume that no large AM transmitters are operating in Afghanistan – at least not in Taliban-controlled areas.

U.S. action to eliminate the Taliban's broadcast facilities does not leave Afghans with nothing to listen to. A Pennsylvania Air National Guard unit, the 193rd Special Operations Wing, has been deployed to the region. The 193rd (the most-deployed unit in the Air National Guard, according to its website) was formed in the late 1960s to broadcast to civilians (and enemy military personnel) in areas where the U.S. military is operating.

This unit uses modified EC-130E airplanes, with antennas mounted under the wings and on the tail. (*See aircraft on our cover - ed.*) The planes can transmit on any VHF or UHF TV channel, with any of the video systems used around the world. They're also capable of AM, FM, and shortwave radio broadcasts. Past deployments of this unit have included Grenada, Panama, Kuwait, Haiti, and Yugoslavia. 10kW of power is available for AM and TV broadcasts, and 1kW for FM. (The AM power is relatively limited, especially given the relatively poor antenna possible. However, the extreme antenna height means the FM and TV broadcasts "get out" very well!)

Frequencies used vary according to local conditions. It seems channels previously used by ground-based stations in the target countries are

often chosen. Over Yugoslavia, 92.5 FM was used; this was the frequency used by independent station B-92 before the Milosevic government shut it down. Pamphlets dropped over Afghanistan indicate three frequencies are being used in connection with Operation Enduring Freedom. AM frequencies in use are 1107 and 864; in addition, a shortwave frequency of 8700 kHz is reported. (Many believe this transmission is *not* from the aircraft – that indeed it may be *to* the plane.) As there was no widespread use of FM, and no TV at all, in Afghanistan at the time of the attacks, the 193rd is not reported to be broadcasting on either of these bands.

An official fact sheet on this "Commando Solo" unit is available on http://sites.state.pa.us/PA_Exec/Military_Affairs/air_national/corsolo.htm .

Broadcasts from neighboring countries are also possible. Pakistan has powerful transmitters at Islamabad (1260 kHz, 500kW, 200mi. from Kabul) and Quetta (756 kHz, 150kW, 120mi. from Kandahar). Since the U.S. military has been known to establish temporary stations in cooperating neighboring countries, it is very possible some such stations are already operating. Or, we could be leasing time on civilian stations in these neighboring countries, notably Pakistan. Any of these special stations would be an unforgettable DX catch.

◆ Bits and Pieces

We have two new AM stations to report this month. A permit has been issued for a station at Manchester, New Hampshire, on 750; it will run 500 watts daytime and 260 watts at night. For many years, WHEB operated on this frequency in nearby Portsmouth, before surrendering its license for cancellation in the mid-1990s. Another new station is now on the air; KVRI-1600 is located at Blaine, Washington. Blaine is on the Canadian border and directional north; it beams religious programming to Vancouver, British Columbia.

There are also five stations gone, at least temporarily, from the airwaves. WBOW-640, WBUZ-1230, KFMZ-98.3, KBMX-101.9, and a Terre Haute, Indiana, FM whose callsign escapes me right now lost their licenses in early October. The two AM stations are also in Terre Haute, and the FMs in central Missouri. Michael Rice, licensee of all five stations, was convicted of serious felonies in state court – and then lied to the FCC about the degree to which he continued to control the stations. The frequencies will be auctioned to new licensees in December.



This is the tower of WILO-1570, Frankfort, Indiana.

I noticed the WILO-1570 tower while stopped for gas in Indiana. Note the X-shaped object near the top; this supports four wires which run back from the top of the tower to the ground. This is a "folded unipole" antenna design.

Here's hoping the need for Operation Enduring Freedom is already over by the time you read this. Whether it is or not, there will be plenty of interesting signals on the air. What are you hearing? Write me at Box 98, Brasstown NC 28902-0098, or by email to w9wi@w9wi.com. Good DX!

Violence Hits Clandestine Radio

Our unlicensed radio coverage is dominated by a blizzard of pirate loggings this month, but we can't ignore the impact of violence on clandestine radio. As reported in *MT* last month, **United Patriot Radio** has left the air after a shooting match between operator Steve Anderson and local Kentucky police. A \$5,000 reward remains outstanding for Anderson's capture. In a similar but unrelated incident, **WWCR**'s longtime militia radio host William Cooper was shot and killed early in November during a shootout with Apache County sheriff's deputies in Arizona.

Meanwhile, plenty of DXers have been hearing the USA-sponsored anti-Taliban broadcasts on 8700 kHz, always in upper sideband mode.

What We Are Hearing

A deluge of pirates were logged by *MT* readers this month. The stations all operate near 6955 kHz, but frequencies are variable to 5 or 10 kHz around that spot.

All Your Base Radio- Music produced by a computer is the staple on this pirate. Sometimes they broadcast in Morse code. (Uses aybradio@yahoo.com e-mail)

Betty Boop Radio- The 1930s and 1940s are gone, but their old radio music lives on here. (Providence)

Blind Faith Radio- Dr. Napalm's classic rock music has been supplemented with music contests lately. (Uses blindfaithradio@yahoo.com e-mail)

Ground Zero Radio- The station has announced future plans for a documentary on the history of pirate radio. In the meantime, rock music is their normal prog. (Blue Ridge Summit)

Iron Man Radio- This new one features Pirate Pete with music and pirate radio news from Chico. (None)

KIPM- They still produce the most elaborate drama programs on shortwave radio today. Some like them, but some are frustrated. (Elkorn)

KRMI- Using their Radio Michigan International slogan, their programming usually changes with the current holiday season. Sometimes the call letters change to **WRMI**. (Uses KRMI6955@hotmail.com e-mail)

Mystery Science Radio- So far music has been a lot more common on the station than either mystery or science has been. (None, asks for logs in *The ACE*)

Paragon Radio- Although rock and blues music has dominated their programming so far, this pirate shows signs of a discussion format as well. (None)

Psyco Radio- An eclectic selection of music is supplemented by a touch of comedy on this by

now veteran pirate, but they still don't communicate with their listeners despite an electronic address. (Uses pscoradiodh@yahoo.com)

Radio Azteca- Bram Stoker has returned with the funniest parody of shortwave listening on the air today. (Belfast)

Radio Forty- Pirates naming themselves after numbers are apparently experiencing inflation. (Uses radio_forty@hotmail.com e-mail)

Radio Three- Sal Amoniac often uses a "3 Rock" slogan on his station, which now plays less insipid pop and more hard rock music. (None, asks for logs in *The ACE*)

Radio USA- Mr. Blue Sky may be the oldest active pirate on the air today. His punk rock and comedy sketch format helped design the classic pirate radio format. (Belfast)

Take It Easy Radio- Their signature theme music is from the Eagles, but during the last couple of months there has been plenty of commentary about the war. (Belfast)

The New Voices of the Purple Pumpkin- This classic pirate radio ID from the 1970s has resurfaced with rock music and barking dogs for an interval signal. (None)

The Purple Nucleus of Creation- Here's a pirate that features only music by the group mentioned in the ID. (None)

The Voice of Aargh- The familiar pirate "aargh" growl now has a station representing it. Captain Greenbeard's shows are mainly rock music. (Wellsville)

United Patriot Militia Bingo- As we see here this month, the demise of Steve Anderson's **United Patriot Radio** clandestine has not killed its parody station. (Merlin)

Voice of Captain Ron Shortwave- Ron has become a leading force on the pirate radio scene, both on his station and on others. (Uses captainronswr@yahoo.com e-mail)

WAIR- Another All India Radio parody has materialized, this time with Robert and Ravi Yardbrown using an All Indy Radio slogan. (None)

WHYP- James Brownyard's old small town programming on his tiny North East, PA, medium wave station continues to be the inspiration for one of the most active pirate stations on the air. (Providence)

WLIS- They remain the only radio station in the world with programming exclusively consisting of interval signals from shortwave broadcasters. (Blue Ridge Summit)

WMFQ- In between their rock music selections, a chanting male chorus always asks about where their QSLs are. (Providence)

WMOE- The call letters come from Moe of the Three Stooges, but their shows are dominated by rock music. (Belfast)

Z-100- Among all currently active pirates, this one is the closest imitation of commercial FM broadcasting outlets. (Uses bigz100fm@yahoo.com e-mail)



Advocating patriotism through the playing of Bingo
UNITED PATRIOT MILITIA BINGO/RADIO BINGO - QSL Verification
Issued to Cleveland Ohio's George Zeller for August 4, 2001 @ 0135 UTC on 6955 kHz



United Patriot Militia Bingo QSL

QSling Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for a souvenir QSL to your mailbox. Letters go to these addresses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 422, Wellsville, NY 14896; PO Box 69, Elkorn, NE 68022; and PO Box 293, Merlin, Ontario N0P 1W0, Canada. A few pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Reports to the *Free Radio Network* (FRN) go to <http://www.frn.net/> on the web. *Free Radio Weekly* loggings go via niel@ican.net e-mail. Sample copies of *The ACE* bulletin are \$2 via the Belfast maildrop.

Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We thank all of our contributors: Jerry Berg, Lexington, MA; Beze Z. Bromo, HI; Ed Cummings, Philadelphia, PA; Rich D'Angelo, Wyomissing, PA; Bill Finn, Philadelphia, PA; Harold Frogde, Midland, MI; Captain Ganja, Belfast, NY; William Hassig, Mount Prospect, IL; Vince Havrilko, Beale AFB, CA; Harry Helms, San Diego, CA; John Herkimer, Caledonia, NY; Ed Kusalik, Coaldale, Alberta; Harald Kuhl, Germany; Chris Lobdell, Stoneham, MA; Larry Magne, Penn's Park, PA; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Bob Montgomery, Levittown, PA; Gary Neal, Sugar Land, TX; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Martin Schoech, Mersburg, Germany; Tom Severt, Frontenac, KS; Lee Silvi, Mentor, OH; Chris Smolinski, Maryland; Bud Stacey, Setsuma, AL; Ken Stout, Louisville, KY; and Niel Wolfish, Toronto, Ontario.

Try Something New in '02

What do you think of when you think about the longwaves? Static? A few local beacons? Repetitive IDs? If so, you are among the majority of shortwave listeners. When I tell fellow radio hobbyists of my interest in the low frequencies, they often respond with blank stares or questions like: "Can you really hear anything down there besides noise?"

For the comparatively few who've given the band a fair try, the reactions are usually quite different. They know the variety of signals that can be heard there and the exciting propagation styles of the band. My goal in this month's column is to encourage newcomers to check out the band for the first time. My timing is not based solely on this being a New Year, but also on the fact that mid-winter is a great time to dip below the 500 kHz barrier. Atmospheric static is virtually non-existent in most areas, and the long periods of darkness promote DX from late afternoon on.

Resources and Tips

If you're just starting out, you'll want to get a listing of longwave beacons before getting too far into your exploration. While you can identify some of the beacons by looking through back issues of *MT*, this becomes more difficult as your list begins to grow. There are some Internet sites that can help you identify beacons – <http://www.airnav.com> is one – but I've yet to find a single website that lists all U.S. and Canadian beacons. In some cases, the crucial two-letter "compass locator" beacons are omitted, or the site focuses on just one country or the other.

While websites can be helpful tools, I prefer to have a *printed* booklet handy for serious DXing. Besides, a noisy computer is a liability when trying for that elusive 25-watt beacon four states away. I began publishing *BeaconFinder* for hobbyists in 1998. It lists the majority of longwave stations that can be heard in North America. (See ad elsewhere in *MT*.)

Here are some other tips for success on longwave, offered in no particular order:

1. **Tune slowly to avoid missing signals!** Beacons are usually assigned to 1 kHz channel spacing, and if you tune too fast, you could skip right over some good DX.
2. **When trying for distant beacons, use your receiver's BFO or CW/SSB setting.** You'll find it much easier to sort through weak signals by "zero beating" their carriers and listening to the keyed Morse ID.
3. **Use a narrow bandwidth setting.** A narrow

filter (500 Hz or less) will go a long way toward blocking out adjacent "pest" signals.

4. **Use a good set of headphones.** They will help you focus on extremely weak signals, and will ensure you won't disturb those around you.
5. **Use a loop or active antenna designed for longwave operation.** Despite their small size, these antennas often out-perform "longwire" type antennas, and almost always provide quieter reception.
6. **If possible, turn off static-producing appliances such as TV sets, computers, dimmer switches, electric motors, fluorescent lights, etc.**

I hope this inspires many readers to check out the longwave band over the winter months. You never know what you'll hear, and a nighttime listening session can net you some surprisingly distant catches. Cuba, South America, and the far north of Canada are all reasonable targets at this time of the year.

What I Use

From time to time, readers ask me what I use for listening to longwave. A straightforward answer is difficult, because it depends on what part of the spectrum I'm listening to, and what my goals are. For general purpose work from 100 to 535 kHz, I use a Drake R8 receiver. The audio quality, adjustable notch filter, and narrow bandwidth setting make the R8 ideal for all around DXing.

If I'm feeling nostalgic, I'll fire up my old National RBL-5, a WWII vintage receiver that weighs in at 80 pounds. This set is a regenerative set, so it takes a bit of fiddling to get a station tuned in. Once you get the hang of it, though, it can hold its own against many of today's newer rigs. It covers 15 to 600 kHz.

For DXpeditions, I always grab my Sony ICF-2010. A friend encouraged me to invest in one of these, and I'm glad I did. The '2010 provides about 90 percent of the features I could ask for in a longwave receiver, and you can't beat the convenience of a portable set for on-the-road listening.

As for antennas, I typically use two at home – a 250 foot random wire, and an LF Engineering L-400B active antenna. I switch between them for the best signal-to-noise ratio. When I'm interested in direction finding, I use a homebrew tabletop loop that that tunes from about 175 to 600 kHz. This antenna was described in the September 1992 *Below 500 kHz*.

Finally, for portable work, I use a Q-Stick Ferrite antenna which can be tuned across the LF/MF bands. It works by coupling to the '2010's internal antenna. No hardwire connections are required.

As you can see, my lineup does not include any truly exotic equipment. I believe the best tools for monitoring success are a good antenna, and some experience tuning the band. Knowing when and where to look for a particular signal is worth at least 10 dB.

Mailbag

Dan Wanchic (MN) wrote to say that he enjoyed the retrospective piece we ran on A/N Range systems in the November 2001 issue. Although these stations were discontinued in the 1970s, Dan was able to locate an old technical manual for them, and gave some more details on their operation. He notes that there were actually two antenna systems commonly used at A/N Range stations. The tower type we described included a fifth antenna at the center of the array that was fed with an offset signal to produce the 1020 Hz modulation. In addition, there was another antenna style that used two rectangular, vertical loops placed at right angles to each other and a separate symmetrical "T" vertical antenna.

Another interesting tidbit involves the "twilight zone." When an aircraft was flying near the center of a course, the "A" and "N" modulation percentages were nearly equal. Apparently, there was quite a bit of slop involved in determining one's position from listening to the signal, and the pilot could not tell if his location was exactly in the center of the course. This area was dubbed "the twilight zone." Dan is not sure if this was the origin of the title for the TV show but it seems very appropriate.

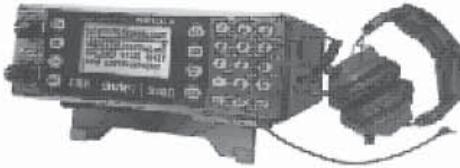
See you next month.



Homebrew tabletop loop used by Lou Rossetti (N1PUX). A turntable is used under the loop for easy rotation and base support.

Big Savings on Radio Scanners

Uniden® SCANNERS



Bearcat® 780XLT Trunk Tracker III with free deluxe scanner headset

Manufacturers suggested list price \$529.95

Less -\$205 Instant Rebate / Special \$324.95

500 Channels • 10 banks • CTCSS/DCS • S Meter

Size: 7^{5/8}" Wide x 6^{15/16}" Deep x 2^{13/16}" High

Frequency Coverage: 25.000-512.0000 MHz, 806.000-

823.9875MHz, 849.0125-868.9875 MHz, 894.0125-1300.000 MHz.

When you buy your Bearcat 780XLTG Trunktracker package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC780XLT scanner purchase, you also get a **free deluxe scanner headphone** designed for home or race track use. Headset features independent volume controls and 3.5 mm gold right angle plug. The Bearcat 780XLT has 500 channels and the widest frequency coverage of any Bearcat scanner ever. Packed with features such as Trunktracker III to cover EDACS, Motorola and EF Johnson systems, control channel only mode to allow you to automatically trunk many systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control with RS232 port, Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, operate your scanner from your computer running Windows. Order Scancat Gold for Windows, part number **SGFW** for \$99.95 and magnetic mount antenna part number **ANTMMBNC** for \$29.95. Not compatible with AGEIS, ASTRO or ESAS systems. For fastest delivery, order on-line at www.usascan.com.

Bearcat® 895XLT Trunk Tracker

Manufacturer suggested list price \$499.95

Less -\$320 Instant Rebate / Special \$179.95

300 Channels • 10 banks • Built-in CTCSS • S Meter

Size: 10^{1/2}" Wide x 7^{1/2}" Deep x 3^{3/8}" High

Frequency Coverage: 29.000-54.000 MHz, 108.000-174

MHz, 216.000-512.000 MHz, 806.000-823.995 MHz, 849.0125-

868.995 MHz, 894.0125-956.000 MHz.

The Bearcat 895XLT is superb for intercepting trunked analog communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning pleasure, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **PS002** DC power cord - enables permanent operation from your vehicle fuse box \$14.95; **MB001** Mobile mounting bracket \$14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. **CAT895** Computer serial cable \$29.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.



Bearcat® 245XLT Trunk Tracker II

Mfg. suggested list price \$429.95/CEI price \$189.95

300 Channels • 10 banks • Trunk Scan and Scan Lists

Trunk Lockout • Trunk Delay • Cloning Capability

10 Priority Channels • Programmed Service Search

Size: 2^{1/2}" Wide x 1^{3/4}" Deep x 6" High

Frequency Coverage:

29.000-54.000 MHz, 108-174 MHz, 406-512 MHz, 806-823.995

MHz, 849.0125-868.995 MHz, 894.0125-956.000 MHz.

Our Bearcat TrunkTracker BC245XLT, is the world's first scanner designed to track Motorola Type I, Type II, Hybird, SMARTNET, PRIVACY PLUS and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as Multi-Track - Track more than one trunking system at a time and scan conventional and trunked systems at the same time. 300 Channels - Program one frequency into each channel. 12 Bands, 10 Banks - Includes 12 bands, with aircraft and 800 MHz. 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. Smart Scanner - Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. Turbo Search - Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz steps. 10 Priority Channels - You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. Preprogrammed Service (SVC) Search - Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - An LCD light remains on for 15 seconds when the back light key is pressed. Autolight - Automatically turns the backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems.

Hear more action on your radio scanner today. Order on-line at www.usascan.com for quick delivery. For maximum scanning satisfaction, operate the Bearcat 245XLT from your computer running Windows. Order Scancat Gold for Windows, part number **SGFW** for \$99.95 or the surveillance enhanced version with audio recording part number **SGFWSE** for \$159.95.

More Radio Products

Save even more on radio scanners when purchased directly from CEI. Your CEI price after instant rebate is listed below:

Bearcat 895XLT 300 ch. Trunktracker I base/mobile scanner.....\$179.95

Bearcat 780XLT 500 ch. Trunktracker III base/mobile.....\$324.95

Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner.....\$159.95

Bearcat 245XLT 300 ch. Trunktracker II handheld scanner.....\$189.95

Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.....\$89.95

Bearcat Sportcat 200 alpha handheld sports scanner.....\$169.95

Bearcat Sportcat 180B handheld sports scanner.....\$149.95

Bearcat 80XLT 50 channel handheld scanner.....\$99.95

Bearcat 60XLT 30 channel handheld scanner.....\$74.95

Bearcat BC7 10 channel handheld scanner.....\$139.95

AOR AR8200 Mark II Wide Band handheld scanner.....\$539.95

AOR AR168Q Wide Band scanner with quick charger.....\$209.95

ICOM PCR1000 computer communications receiver.....\$379.95

ICOM R10 handheld wideband communications receiver.....\$279.95

ICOM R3 handheld wideband receiver with video display.....\$379.95

Uniden WX100 Weather Alert with S.A.M.E. feature.....\$49.95



AOR® AR8200 Mark IIB Radio Scanner

AOR8200 Mark IIB-A wideband handheld scanner/SPECIAL \$539.95

1,000 Channels • 20 banks • 50 Select Scan Channels

PASS channels: 50 per search bank + 50 for VFO search

Frequency step programmable in multiples of 50 Hz.

Size: 2^{1/2}" Wide x 1^{3/8}" Deep x 6^{1/8}" High

Frequency Coverage:

500 KHz to 823.995 MHz, 849.0125-868.995 MHz, 894.0125-2.040.000 MHz

(Full coverage receivers available for export and FCC approved users.)

The AOR AR8200 Mark IIB is the ideal handheld radio scanner for communications professionals. It features all mode receive: WFM, NFM, SFM (Super Narrow FM), WAM, AM, NAM (wide, standard, narrow AM), USB, LSB & CW. Super narrow FM plus Wide and Narrow AM in addition to the standard modes. The AR8200 also has a versatile multi-function band scope with save trace facility, twin frequency readout with bar signal meter, battery save feature with battery low legend, separate controls for volume and squelch, arrow four way side rocker with separate main tuning dial, configurable keypad beep/illumination and LCD contrast, write protect and keypad lock, programmable scan and search including LINK, FREE, DELAY, AUDIO, LEVEL, MODE, computer socket fitted for control, clone and record, Flash-ROM no battery required memory, true carrier re-insertion in SSB modes, RF preselection of mid VHF bands, Detachable MW bar aerial. Tuning steps are programmable in multiples of 50 Hz in all modes, 8.33 KHz airband step correctly supported, Step-adjust, frequency offset, AFC, Noise limited & attenuator, Wide and Narrow AM in addition to the standard modes. For maximum scanning pleasure, you can add one of the following optional slot cards to this scanner: CT8200 CTCSS squelch & search decoder \$89.95; EM8200 External 4,000 channel backup memory, 160 search banks. \$69.95; RU8200 about 20 seconds chip based recording and playback \$69.95; TE8200 256 step tone eliminator \$59.95. In addition, two leads are available for use with the option socket. CC8200 personal computer control lead \$109.95; CR8200 tape recording lead \$59.95. Includes 4 1.000 mAh AA ni-cad batteries, charger, cigarette lighter adapter, whip aerial, MW bar antenna, belt hook, strap and one year limited AOR warranty. Enter your order now at <http://www.usascan.com>.

Buy with Confidence

Order on-line and get big savings

For over 32 years, millions of communications specialists and enthusiasts worldwide have trusted Communications Electronics for their mission critical communications needs. It's easy to order. For fastest delivery, order on-line at www.usascan.com. Mail orders to: Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 USA. Add \$20.00 per radio transceiver for UPS ground shipping, handling and insurance to the continental USA. Add \$13.00 shipping for all accessories and publications. For Canada, Puerto Rico, Hawaii, Alaska, Guam, P.O. Box or APO/FPO delivery, shipping charges are two times continental US rates. Michigan residents add sales tax. No COD's. Your satisfaction is guaranteed or return item in unused condition in original packaging within 61 days for refund, less shipping, handling and insurance charges. 10% surcharge for net 10 billing to qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. We welcome your Discover, Visa, American Express, MasterCard, IMPAC or Eurocard. Call anytime 1-800-USA-SCAN or 800-872-7226 to order toll-free. Call 734-996-8888 if outside Canada or the USA. FAX anytime, dial 734-663-8888. Dealer and international inquiries invited. Order your radio scanners from Communications Electronics Inc. today at www.usascan.com.

For credit card orders call 1-800-USA-SCAN

e-mail: cei@usascan.com

www.usascan.com

PO Box 1045, Ann Arbor, Michigan 48106-1045 USA

For information call 734-996-8888 or FAX 734-663-8888

Price schedule effective September 1, 2001 AD #080101 © 2001 Communications Electronics Inc.



COMMUNICATIONS ELECTRONICS INC.

Emergency Operations Center

Visit WWW.USASCAN.COM • 1-800-USA-SCAN

New Year in Ham Radio

Well, here we are in 2002. If you are interested in making New Year's resolutions, we can make them fairly simple in the world of amateur radio:

- If you're not licensed... Get licensed!
- If you are licensed... Upgrade!
- Find somebody new to get licensed and help them do it!
- Repeat the number three!

One good tradition for starting off the New Year is to get things off your chest from last year. Sort of like starting things off with a clean slate. It's hard for a curmudgeon to completely clean his slate off, but I think I can make a good stab at it. Here goes.

◆ The New Novice Band?

Let me tell you a story. Back in 1976 when I was a newly minted ham, my callsign was WN2GHA. The "N" in there stood for Novice. Back then, in our country's bicentennial year, folks who passed the most basic of amateur radio tests had their own little chunk of frequencies to use, the Novice Bands. There was 50 kHz on 80 meters, 50 kHz on 40 meters, 100 kHz on 15 meters and 100 kHz on 10. (Back then I often got the feeling that we weren't even supposed to *listen* to 20 meters.) We were also limited to 75 watts and CW only. Not much to work with.

Now let's tack on a few more practical facts. Most Novices were teenagers or college students, all fairly short on the kind of cash it takes to get really high quality equipment. This would mean a receiver would have a rather generous selectivity, usually in the range of 5–10 kHz. Now picture your average Saturday night with several *thousand* folks on that teeny chunk of 40 meters trying to sort out one signal from another with those barn door wide IF filters. (The first time I heard a high quality receiver with a 250 Hz CW filter I thought the radio was broken! I couldn't hear all those signals at once.) Throw in a driftly third-hand transmitter with stale tubes and a couple of spurs, and you've got a sense of the real adventure of amateur radio.

The Novice bands were a lot of fun. Most of us had little idea about what we were doing. Those tiny chunks of radio real estate gave us all a place to mess up gracefully. We could develop our skills without facing any serious ridicule because, face it, everybody was just about as bad as everybody else. We honed our skills while we studied for the General Class. It was a bit wild at times, but it sure was fun.

Well the FCC has put the old Novice Class license up on the shelf. More than a few folks think this is a good thing. By making the Technician Class ticket the entry-level license, a per-

to recall their early days on the old Novice portions of the spectrum. The new license structure, regardless of your personal feelings about it, has essentially created an environment where the 2 meter repeater band is the "new" novice band. But there is one very important difference.

Unlike the old Novice bands where most of the folks were raw recruits operating in a blind leading the blind situation, the 2 meter repeater band is populated with a majority of folks possessing years and years of ham radio experience. Instead of stumbling around on his or her own, learning from their mistakes or those of others, experienced hams have the opportunity to help newcomers along. I am by nature an *Elmer*. When

I near a new callsign and those more or less obvious signs of *mike shyness*, I go out of my way to be as friendly and as helpful as I can. We've all been there at one time or another and we've all wished for a helping hand. Besides, you may even make a new friend who can come over and help hold the ladder the next time you need to climb up to do some antenna work.

Incidentally, the Novice Bands are still around. (Although there is much talk of refarming their use.) They currently are places where lower speed code operators go to learn their CW skills. You'll still find them fairly friendly places to begin Morse Code operation. If your license allows for it (the old Tech Plus, the new General or even one of the few remaining valid Novice tickets) jump on in!

◆ Real No Code?

By now most folks have heard that the International Amateur Radio Union (IARU) Administrative Council is calling for an end to the Morse Code testing requirement worldwide. This is another issue that has caused a lot of strong feelings in the ham community. In a way, it relates to the abovementioned new ham/novice band issues.

I wonder if anyone has done a true study of the number of newly licensed Technicians that stay Techs without upgrading? Further, has there ever been a good study of the number of hams, old and new, who may have passed the various code requirements but never actively pursued the CW mode in their normal daily ham opera-



son can experience all of amateur radio's modes on any legal frequency above 50 MHz. It has been this way for almost two years as you read this. During that time, I've run across more than a few allegedly *higher class* folks who have not been all that kind and helpful to newcomers in amateur radio's midst. Left without a place of their own to hone their basic radio skills, beginners now have to jump in with both feet. It's hard to believe that there are a few folks in our hobby who would not take a few extra moments to help a newcomer along when they first break squelch on a local 2 meter repeater. Folks need

tions? I think we would quickly discover that voice modes dominate ham operation. It begs the question, especially given the difficulties and challenges for those new operators first keying their microphones on 2 meters: Shouldn't we test phone procedures instead of CW practices?! Come to think of it, my ability to pass the CW tests (and I've taken them all up through 20 wpm) *never* reflected the quality of my *fist* or my true operating habits.

If you have been involved lately in PSK31 operations, the *waterfall display* on your software package has probably revealed quite a few folks who are overdriving their signal to the point of unintelligibility. Further, these wide-signaled folks are taking up 'way too much bandwidth and defeating the whole purpose and promise of digital amateur radio communications. (Need we mention that they are also breaking the rules?) Maybe we need a test that checks out a person's ability to use this mode as well.

Okay, the point I'm trying to make is that, in the long run, it's probably impractical to test people in *any* particular mode, especially those that wax and wane in popularity. It would seem the best practice would be to make sure that the written tests for any license support questions concerning good amateur practice using *all* bands and modes. With that understood, then self-policing and government monitoring can adequately do their job.

Does a lack of CW testing mean that the CW mode is dying or going to go away? Not very likely. We still have CW portions of the bands. On any of those CW frequencies you can always find a QSO and often find a pile-up that will challenge your narrowest filter setting. I personally operate over 95% CW based upon my logs. I'm not planning on changing my operating habits based upon the presence or lack of any testing requirement.

The fact is that I barely ever operated CW back when I was going through the various CW tests. I only really fell head over heels for CW operation when the burden of passing those code tests was behind me. I'd rather see rules and tests that encourage and train people in all modes of amateur radio communication. I also wonder if, being freed from the testing requirement, folks will have the same experience I did and come down to the CW frequencies out of a love for the challenge and fun of CW operation.

❖ Contest Weekends

I would call myself a casual contester. When one of the big events is on the air I like to dig around for new countries or test the ability of my station to get through to a particular place on a particular band, usually using the lowest power possible (I enjoy QRP operation). But mostly I'm a ragchewer by nature. The quick contest exchanges leave me a bit cold. So I'm one of a growing number of folks who wishes that all the major contest events would set some reasonable frequency limits. Believe it or not, there are quite a few DX stations that do not enjoy having thousand of signals coming at them all at once. There are DX ragchewers, too. They sit down to their radios to meet people and learn about the world, just like I do. These folks should

have a safe haven on the bands during contests where they can do what they want to do.

I'll never forget one exchange I had during a major contest weekend some years back. A DX station was on the air and I could tell right off the bat by his slower code speed he simply wasn't in the game. (Contests code speeds tend to run in the 30+ wpm range, this OM was operating at around 12 wpm.) I came back to him at his speed and discovered that he was just a guy who had come home from work and was looking for a chat. We had a good path and we talked for almost an hour. A lot of *serious* contesters probably were unhappy about this, especially when this guy signed to go to dinner after we had said our 73's. Had they read the mail they would have understood that this particular DX station just wasn't interested in contesting.

What I would propose (as if anyone would listen), would be a 30 kHz minimum, *No Contest* window (within the normal DX portions of each band) on all bands. Failing to abide by this would result in disqualification. The reply that is so often returned to this request is that non-contesters can always use the WARC bands during contests, because these are considered contest-free bands. Well, that is fine and dandy if you own equipment that covers these bands. (30, 17 and 12 meters). There are still a lot of rigs, especially in the hands of budgeted DX operators, that only cover the traditional 80, 40, 20, 15 and 10 meters bands. These folks should still get a little bit of consideration during contest weekends.

Well, there you have it. Now I can get back to working folks on 40 meters (and lately I'm spending a lot of time on 30 meters). CU down the log. Have fun!

UNCLE SKIP'S CONTEST CORNER JANUARY 2002

Jan 5, 2002

ARRL RTTY Roundup

1800 UTC, Jan 5 – 2400 UTC, Jan 6

Jan 11, 2002

Japan International DX Contest, 160-40m

2200 UTC, Jan 11 – 2200 UTC, Jan 13

January 12, 2002

North American QSO Party, CW

1800 UTC, Jan 12 – 0600 UTC, Jan 13

January 19, 2002

MI QRP January CW Contest

1200 UTC, Jan 19 – 2359 UTC, Jan 20

North American QSO Party, SSB

1800 UTC, Jan 19 – 0600 UTC, Jan 20

ARRL January VHF Sweepstakes

1900 UTC, Jan 19 – 0400 UTC, Jan 21

January 25, 2002

CQ 160-Meter Contest, CW

2200 UTC, Jan 25 – 1600 UTC, Jan 27

January 26, 2002

Kansas QSO Party

1800 UTC, Jan 26 – 1800 UTC, Jan 27

GORDON WEST

HAM TEST PREP TAPES

BOOKS SOFTWARE VIDEOS

Prepare for your ham test with "Gordo" WB6NOA as your personal instructor.

- **THE NEW THEORY** on audio cassettes
No-Code Technician (4 tapes)..... \$19.95
General Class (4 tapes) \$19.95
Amateur Extra Class (4 tapes)..... \$19.95
- **THE CODE** on audio cassettes
Learning CW (0-7wpm 6 tapes)..... \$29.95
Speed Builder(5-16wpm 6 tapes).... \$29.95
Speed Builder(10-28wpm 6 tapes).... \$29.95
- **NEW STUDY MANUALS** by "Gordo"
No-Code Technician (Element 2)..... \$11.95
General Class (Element 3)..... \$12.95
Extra Class (Element 4)..... \$14.95
- **PC SOFTWARE** with study manuals
No-Code Technician (Element 2) \$34.95
Tech/Tech+/Gen. (+ Code, Windows) \$49.95
General Class (3+Code, Windows).... \$34.95
Extra Class (4 + Code Windows)..... \$34.95
Ham Operator (Tech-Extra +Code).... \$59.95
Morse Software Only..... \$12.95
- **VIDEO** VHS with study manual
No-Code Tech Video Course..... \$31.95

Add \$4.00 for shipping 1st item, \$1.50 each additional
Priority Mail 2-3 day service available
VISA, MasterCard, Discover & AMEX Accepted

W5YI Group

P. O. Box 565101 • Dallas, TX 75356
Call Toll Free **1-800-669-9594**

Shortwave Receivers

Past & Present

Communications Receivers 1942-1997

RECEIVERS

PAST & PRESENT

Communications Receivers

1942-1997

- New 3rd Ed.
- 108 Chapters
- 472 Pages
- 840 Photos
- Printed 03/96
- Covers 1942 to 1997.
- 770 Receivers
- 660 Variants
- Includes 98 U.S. and Intl. manufacturers
- Only \$24.95

This huge 472 page Third Edition includes over 770 shortwave and amateur communications receivers made from 1942 to 1997. Here is everything you need to know as a radio collector or informed receiver buyer. Entry information includes: receiver type, date sold, photograph, size & weight, features, reviews, specifications, new & used values, variants, value rating and availability. Ninety eight worldwide manufacturers are represented. 840 Photos. Become an instant receiver expert!



Universal Radio

6830 Americana Pkwy.

Reynoldsburg, OH 43068

♦ Orders: 800 431-3939

♦ Info: 614 866-4267

www.universal-radio.com

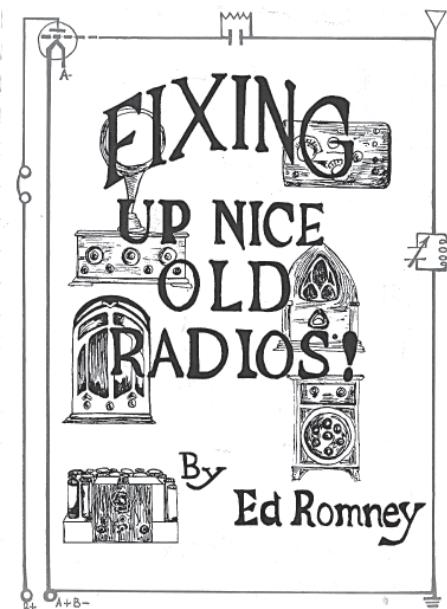
Books About Restoring Radios

Although we are now working on some World War II surplus command sets, a number of events have converged this last month to preempt most of my bench time. So this seemed to be a perfect opportunity to do a column on radio servicing and restoration books. As mentioned last month, it's a topic near the top of my priority list.

We won't be covering general books on collecting here; the emphasis will be on references to help you with the process of radio fixing. Some of the books to be mentioned are still in print and available from antique radio hobby supply suppliers; others can be found by scouting radio meets and flea markets. In the latter group, I'll try to stick with titles that I know to be worthwhile and reasonably easy to find.

Recent Books

These are books you'll, mostly, be able to order today from such sources as Antique Radio Classified Magazine (978-371-0512; ARC@antiqueradio.com; <http://www.antiqueradio.com>) or Antique Electronic Supply (480-820-5411; <http://www.tubesandmore.com>). Prices are as listed in the AES 2001 Catalogue and do not include their shipping/handling charges.



Cover of Romney's book has an engaging home-made appearance.

I'll cover ones with titles I've read and can recommend. All are soft cover.

Fixing Up Nice Old Radios by Ed Romney. This plastic spiral bound reference is profusely illustrated and fun to read. After suggesting tools and test instruments and giving a smattering of radio theory and radio history, Ed discusses approaches to troubleshooting various early radio circuits. Specific classic receivers are used as case histories to illustrate various approaches to restoration. The book closes with useful tips on cabinet restoration and other cosmetic issues. 185 pages. \$33.00.

Old Time Radios! Restoration and Repair by Joseph J. Carr. The late Joe Carr was arguably the most prolific recent writer of both hobby- and commercial-oriented electronics articles and texts. He does not write about antique radios from the point of view of a lover and collector. It's fairly obvious that this text was written to fill a market niche. Carr breaks down various radio designs into their key circuits and discusses their operation. In the final chapters he discusses test equipment, troubleshooting, alignment techniques, electrical safety and, for some reason, repairing radios damaged by water. There's not much warm fuzzy stuff about our hobby – but when Joe Carr talks technical, it's wise to listen! 256 pages. \$19.95

How to Repair Old-Time Radios by Clayton L. Hallmark. Regrettably, this 1979 publication seems to have disappeared from booksellers' shelves. The 249-page volume is Tab Books #1148. ISBN 0-8306-9737-3 (hardbound) ISBN 0-8306-1148-7 (softbound). You may be able to find a copy through a book locating service or by keeping your eyes open at hamfests and radio meets. Hallmark's approach is somewhat a blend of Romney's and Carr's. He takes a modular look at radio restoration problems, focusing on circuitry and, to a larger extent, repair of individual parts. He discusses repair problems generically without often referring to specific radios. His troubleshooting approaches are very useful, as is his guide to alignment procedures. This is a man who enjoys working with and restoring old sets, and his enthusiasm shows in his writing. My copy is very well thumbed – try to find one for yourself!

1937 Sylvania Tube Manual, as published by the king of technical reprinters, Lindsay Publications. Every radio restorer needs a tube manual so that he can identify

Sylvania TYPE 01A DETECTOR AMPLIFIER		
CHARACTERISTICS		
Filament Voltage DC Filament Current		
5.0 Volts 0.25 Amperes		
Direct Interelectrode Capacitances:		
Grid to Plate Input Output		
7.5 μ uf 2.6 μ uf 2.0 μ uf		
Maximum Over-all Length Maximum Diameter Bulb Base—Medium 4-Pin		
4 $\frac{1}{2}$ " 1 $\frac{1}{2}$ " ST-14 4-D		
Operating Conditions and Characteristics:		
Filament Voltage Plate Voltage Grid Voltage Plate Current Plate Resistance Mutual Conductance Amplification Factor		
5.0 5.0 Volts 90 -4.5 2.5 11000 725 8		
5.0 185 Volts -9.0 Volts 3.0 Ma. 10000 Ohms 800 μ hos 8		
CIRCUIT APPLICATION		
Sylvania 01A is a general purpose tube of the triode type for use in battery operated receivers. This tube may be employed as a detector, radio frequency and audio frequency amplifier. Type 01A is now used primarily for replacement of tubes in old receivers.		

The 1937 Sylvania tube manual provides plenty of data, even for older tubes relegated to the "Supplementary" section.

tube pinouts and operating parameters. Most of the manual reprints now available were originally published in the 1960s or later. They have more tubes in them than earlier editions, but the tubes that had become obsolete (in other words the ones of greatest interest to us) are apt to be hard to look up – often relegated to special tables providing minimal data. This edition is early enough so that most tubes of interest to us are located in their proper numerical spot in the book and full data is given. Some older tubes are located in a "supplementary" (thankfully not tabular) section – but even here the data given is more than adequate. 183 pages. \$12.95.

Out of the Past – Servicing

One of my favorite pastimes at radio meets is looking for classic books on radio servicing and theory. I have many in my library, but there are just a few I'd like to recommend highly for any new restorer's library. Look for these first!

Modern Radio Servicing by Alfred A. Ghirardi published 1935 by Murray Hill Books, Inc. Mine is the fifth impression, dated 1943. This large (1318 page) volume was authored by one of the deans of radio service writing. I think it should be in every restorer's library because it is practical, au-

CONTROLS							CONDENSERS				VIBRATORS			I. F. Peak	Rider's Reference
Use	Circuit	Correct Replacement	Switch	Bias	#Note	Original Part	Circuit	Correct Replacement	#Note	Replacement	#Note	No. Tubes	Complete Tube Complement		
Continued						22538	25	WE350				8	56, 58, 55, 57, 47, 80,	130	3-137
Vol.	13	N				22538	1	WE350				6	247, 58, 246, 245, 80	472.5	5-13
Sil.	12	A20M15				22538	1	SS579	B111			6	78, 647, 85, 243,	472.5	7-17
Vol.	17	N				22538	39	2N516	B11			8	64K2, 648, 6K7, 6F6	472.5	7-19
Vol.	18	N				22538	1	RS216				6	524,	472.5	7-19
Vol.	18	N				22538	15	BB12				6	647, 78, 75, 43, 84,	264	6-7
Vol.	19	N				22538	1	2N517	B23	F297	C3	5	647, 78, 75, 43, 84,	264	6-7
Vol.	18	N				22538	1	WE350				6	6D6, 6A7, 75, 42, 80,	472.5	7-21
Vol.	18	N				22538	1	WE351				6	6D6, 6A7, 75, 42, 80,	472.5	7-21
Vol.	55	N				22538/25168	1	SS579	B111			7	58, 55, 56, 2A5, 80,	264	4-4
Vol.	55	N				22538	1	WE350				6	58, 55, 56, 2A5, 80,	264	4-4
Vol.	13	N				22538	15	BB12	B11			6	78, 75, 43, 37,	264	4-5
Vol.	13	N				22538	4	2N516				8	27, 24, 38, 47, 80,	130	3-139
Vol.	13	N				22538	12	ST593				8	64K2, 648, 6K7, 6F6	130	3-141
Vol.	13	N				22538	4	WE350				8	35, 24, 27, 47, 80,	130	3-141
Vol.	15	L				22538	4	CS133				7	432, 330, 33,	130	3-145
Vol.	18	N				22538	12	WE351				6	58, 55, 56, 2A6, 2A5, 80,	125	7-23
Vol.	18	N				22538	12	WE350				6	58, 55, 56, 2A6, 2A5, 80,	125	7-23
Vol.	18	N				22538	15	ST593				6	58, 55, 56, 2A6, 2A5, 80,	125	7-23
Vol.	18	N				22538	15	BB12				6	58, 55, 56, 2A6, 2A5, 80,	125	7-23
Vol.	19	TRP611				22538	1	2N516	294	C3		7	1G6, 344, 1B5, 30, 19	472.5	6-12
Vol.	55	N				22538	1	Buffer	B14			6	56, 57, 58, 55, 47, 80,	262.5	3-147
Vol.	19	TRP611				22538	25	WE350				5	6A8, 6K7, 75, 6F6, 80	450	7-25
Vol.	15	N				22538	2	WE350				10	58, 55, 56, 47, 80,	130	3-149
ToneB'm	1	M15MP				22538	2	WE350				10	57, 58, 55, 56, 47, 80,	130	3-153
ToneB'm	18	N				22538	2	WE350				10	57, 58, 55, 56, 47, 80,	130	3-153
Sil.	12	A20M15				22538	1	WE350				6	57, 58, 55, 56, 47, 80,	262.5	4-6
Sil.	18	N				22538	6	2N516				3	1A6, 344,	262.5	7-26
Sil.	18	N				22538	8-8	2N516	B111			3	6A7, 44, 75, 43, 25Z5,	262.5	4-7
Sil.	18	N				22538	29	UR190	B72			6	6A7, 44, 75, 43, 25Z5,	262.5	4-7
Sil.	55	N				22538	29	26158				5	1G6, 34, 32, 33, 30, 31	450	6-13
Sil.	45	N				22538	13	ST593				5	1G6, 34, 32, 33, 30, 31	450	6-13
						A13									

Listings from Mallory Radio Service Encyclopedia, Third Edition. Note that the tube complement, i.f. peak and Rider's volume are given in the three right-hand columns.

thoritative, and written when many of the sets we're interested in were new and problems in fixing them were fresh.

Part I deals with testing and testing equipment and contains much of value. However, there is an emphasis on building your own equipment, and that's not much use to us today. Commercial equipment of far better design and quality is available, at low cost, at most radio meets. Part II covers troubleshooting and alignment, and contains the content most helpful to us. Part III is a devoted to miscellany of varying interest. But the section on servicing allwave receivers is very useful. And if you haven't found yourself a tube manual yet, you'll be glad to have the tube characteristics and basing chart in the appendix (Part IV). Though the data is tabular and brief.

This fat, navy blue volume shows up frequently at radio meets and is easy to spot. Some still have their deep blue dust jackets with bold graphics in white. The price is usually in the \$15.00 range.

Another Ghirardi book, *Radio Physics Course* (Radio Technical Publishing Co., 1933) is largely theoretical, as its name implies. I don't use it much, but am happy to have it in the library as another example of this famous author's work. On the other hand, a more modern book co-authored by Ghirardi and J. Richard Johnson (*Radio and Television Receiver Troubleshooting and Repair*, Rinehart Publishing, 1952) has a nice mix of practical and theoretical information and gives us the benefit of Ghirardi's later thinking on servicing issues.

The books co-authored by William Marcus and Alex Levy show up in bewildering profusion at the radio meets. In my library are *Practical Radio Servicing*, *Practical Radio Troubleshooting*, and *Elements of Radio Servicing*. They were published in the late forties through mid fifties by McGraw Hill. Both authors bring to these books a strong background in vocational teaching at

the junior high and high-school level. As you might expect, content is quite hands-on and practical. I enjoy these volumes and sometimes find their problem solving approach useful in areas where other references fail. There is much overlapping content among the books, but I still pick up new variations every time I see them for sale.

Just to confuse the issue, I've also found and enjoyed books by Abraham Marcus (*Radio Servicing*, Prentice Hall, 1948, 1954) and John Markus (*Television and Radio Repairing*, McGraw Hill, 1953, 1961.). Abraham and William have written servicing books together and I would think the men must be brothers or otherwise related. I can't guess about John (note difference in spelling of last name). John's book has a practical approach quite similar to William's publication.

◆ Out of the Past – Reference

Speaking of tube manuals, RCA regularly updated and republished its pocket-book-sized *RCA Receiving Tube Manual* over the years. They show up regularly at meets and seem to come in at about 5 bucks now. Keep your eyes open for years that will fill gaps in your library.

If you can find editions of the *Mallory Radio Service Encyclopedia*, pick them up! I have a 1937 first edition (hardbound) 1939 third edition (softbound) and 1948 sixth edition (1948). All three books contain encyclopedic listings of virtually every set made up to the publishing date. The listings include Mallory numbers for replacement parts, but of more interest to us are the tube complements, which are very helpful in identifying sets with missing model numbers, the i.f. frequency and (in my third and sixth editions) the *Rider's Manual* volume in which the set appears. Very helpful if you have some Rider's volumes but no Rider's index.

Speaking of Rider's, no reference listing would be complete without mentioning the famous Rider's manuals. These manuals cover

most receivers made in this country from the beginning of broadcast radio manufacturing to the mid 1950s. The 23 massive tomes occupy several feet of shelf space but are well worth having. I use mine all the time. A definitive article on Rider's would probably take up more space than I have in a whole column, so I'll have to be satisfied with brief overview.

Collecting Rider's at radio meets can be a fun and rewarding activity. The early volumes (maybe 1-4) tend to be high priced; the middle volumes (maybe 5-15) can be quite reasonable, sometimes as low as \$10; fewer and fewer copies were published over the later years as Rider lost business to competing publications so, following the law of supply and demand, prices get higher again for the later numbers. I had to pay \$40 some ten years ago to get a volume 21 to complete my set.

Rider's supplied sets to be given away as part of tube deals by major tube manufacturers, and some of my volumes carry their logos. I was fortunate enough to find a one-volume, complete compendium of volumes one through three sponsored by RCA. This became the seed of my collection. There are also volume one and two combinations, sometimes abridged – so watch out! You can buy a complete collection of Rider's on CD, but cost is fairly substantial and you should be sure the scanning resolution was adequate to show all of the fine (sometimes tiny) print. Of major importance to a Rider user is a complete set of Rider indexes. Originals are rare, but reprints are available through antique radio hobby outlets.

JOIN THE AWA

Antique Wireless Association

The original and largest historical radio-collector group

- Publishes *The Old Timer's Bulletin*, Marc Ellis, Editor, with
 - Battery and AC receiver restoration
 - Vacuum-tube history and collecting
 - Old-time amateur-radio contests
 - Communications receivers
 - Free want-swap ads
 - Early television
 - Horn loudspeakers
 - News of U.S. and foreign clubs
- Produces the famous annual Rochester meet
- Maintains unique radio-TV museum

Membership is only \$15 per year (\$27 for two years, \$18 per year for overseas). Mail check to:

Antique Wireless Association, Inc. • Box E, Dept. 2
Breeport, NY 14816 <http://www.antiquewireless.org>



FREE SAMPLE COPY!

ANTIQUE RADIO CLASSIFIED

Antique Radio's Largest-Circulation Monthly Magazine

Articles - Classifieds - Ads for Parts & Services

Also: Early TV, Ham Equip., Books,

Telegraph, 40's & 50's Radios & more...

Free 20-word ad each month. Don't miss out!

1-Year: \$39.49 (\$57.96 by 1st Class)

6-Month Trial - \$19.95. Foreign - Write.

A.R.C., P.O. Box 802-P14, Carlisle, MA 01741

Phone: (978) 371-0512; Fax: (978) 371-7129

Web: www.antiqueradio.com

Some Ways in which Antennas Differ

Although all antennas serve to either receive or launch radio signals, there are important differences in how they get those jobs done.

◆ Resonant and Non-resonant Antennas

An antenna is resonant when its electrical characteristics tune that antenna to the operating frequency of the antenna. This aspect of antennas qualifies as "tuning" just as much as the process which separates stations when we tune our receiver from station to station.

An antenna's tuning is less selective than is the receiver's tuning, but the selectivity which it has is useful at times. It will help, to some degree, in rejecting interfering, off-frequency signals. Resonance will also increase the antenna's signal output to the receiver from signals at its resonant frequency. Common resonant antenna designs are the halfwave dipole, the quarterwave groundplane, and the Yagi-Uda beam. Well-known, non-resonant designs include the terminated Beverage, terminated rhombic, and the T2FD.

◆ Antennas May Utilize Standing Waves or Traveling Waves

When an antenna is resonant, the energy of the EM signal which it receives traverses the antenna element in such a way that each succeeding received cycle reinforces the energy already oscillating in the element from previously received cycles. This sets up standing waves of

voltage and current in the antenna.

In non-resonant antennas each cycle of received energy traverses the element only once, and what is not transferred to the receiver's feedline, reradiated, or converted to heat in the ohmic resistance of the antenna element, flows to a terminating resistance and is converted to heat there. Because they do not support standing waves, such terminated antennas lack a resonant frequency. Thus they are usually called something like "broad-band," or "all-band" antennas.

◆ Electric, Capacitive, and Magnetic Antennas

An electromagnetic (EM) wave traveling (propagating) through space exists alternately as an electrical field, and then as a magnetic field. The wave continually changes between these states as it propagates. A receiving antenna can be configured such that it responds primarily either to the electric field or to the magnetic field of the waves which encounter the antenna. No antenna is completely magnetic or completely electric, but linearly constructed antennas such as long wires, dipoles, and groundplane antennas are much more responsive to the electric field of an oncoming wave than to its magnetic field. Most commonly available antenna designs produce electric antennas.

Some receiving-antenna elements, such as motor-vehicle, AM-broadcast receiver antennas, are very short compared to the wavelengths which they receive. Although these antennas respond to the electric field, their functioning is not based on traveling waves or standing waves.

It may be most appropriate to think of these antennas as "capacitive antennas," or one plate of an "antenna-vehicle body" capacitor which is charged by the passing wave.

Loop antennas, such as table-top loops, which are very small in relation to the wavelength received, respond primarily to a wave's magnetic field. They are known as "magnetic antennas."

◆ Linear, Elliptical, and Circular Polarization

The electrical and magnetic fields of an EM wave are oriented at right angles to each other, and to the direction of wave travel. The term "polarization" is used to describe the orientation of the wave's electrical field. Waves whose electrical field is parallel to the earth are called "horizontally polarized." Those waves whose electrical field is perpendicular to the earth are called "vertically polarized." Waves at angles between vertical and horizontal can be described as having "slanted" polarization.

There also are antenna designs which produce "elliptical" or "circular" polarization. These types of polarization show an apparent rotation of the electric field orientation as they travel through space.

Depending on its design an antenna can have any one of the polarizations described above (fig. 1). An antenna will give maximum output in response to waves of the same polarity as the antenna. Differences in polarity between the wave and the antenna can cause very significant losses in received signal strength.

◆ Directional, Non-Directional, and Omni-Directional Antennas

As a standard of comparison for antenna designs, antenna engineers utilize a theoretical antenna called an "isotropic" antenna. The isotropic antenna is said to radiate its EM waves equally in all directions. Thus a wavefront leaving the isotropic antenna in space would be a sphere which grows larger as the wave travels farther away from the antenna. Obviously this antenna is non-directional: it launches and receives waves equally from all directions: upward, downward, all angles in between up and down, and to all directions of the compass.

In our real world no practical antenna is completely non-directional. But some antennas perform relatively equally in all horizontal directions from the antenna. A quarterwave

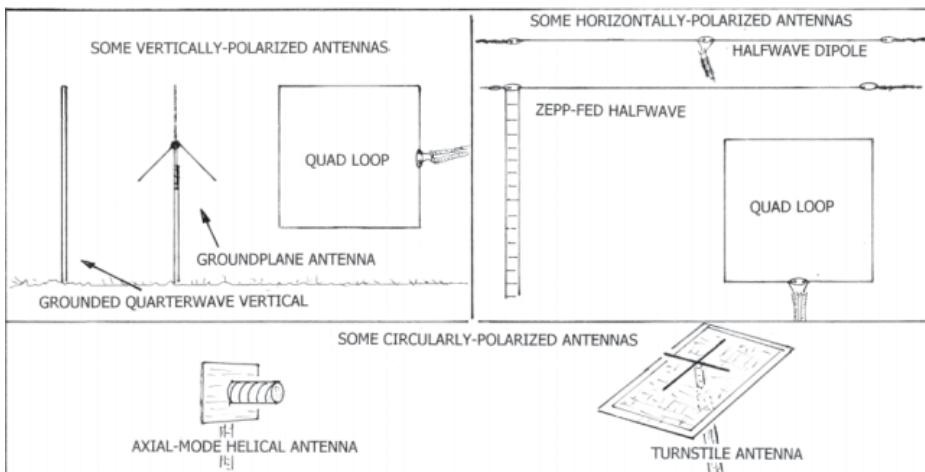


Figure 1: Examples of antennas with different polarizations.

This Month's Interesting Antenna-Related Web site:

Want an antenna-theory course designed for non-engineers? Check out:
<http://www.ewh.ieee.org/soc/cpmt/newsletter/200103/ant.html>.
Or a refresher for engineers? Try:
<http://www.ieeeaps.org/080598.html>

groundplane antenna is good example of this. Because of this, the groundplane antenna is commonly called "non-directional," although it has no significant radiation in the directly-upward direction. And even when this antenna is high above the ground it has no significant directly-downward radiation. Actually, an antenna with a pattern like the quarterwave groundplane antenna is more properly called "omni-directional."

Designing antennas to shape their radiation and reception pattern and thus to concentrate radiation and reception at desired directions, makes possible highly-directional antennas called "beams." Examples of popular beam antennas are the Yagi-Uda, the LPDA, antennas with parabolic reflector dishes, and the cubical quad.

◆ Antenna Gain

When an antenna is made directional it yields greater output to its receiver from signals coming from the antenna's favored direction. Thus we say that the antenna has more "gain" in the directions which it favors. Sometimes, such as in UHF weak-signal work, it is important to have high gain in an antenna. Sometimes, as in HF work, when the level of received noise is high, gain level is much less important than the directional characteristics, or the noise-responsiveness of the antenna.

◆ Feedpoint Impedance

There is a wide range of values in the feedpoint impedances of different antennas. Feedpoint impedance changes with such variables as type of antenna, point on the antenna at which the feedline is attached to the antenna, height of the antenna above ground, and proximity of the antenna to other conductors. When the impedance of the chosen feedpoint and the impedance of the feedline are not similar, some form of matching between the two is usually required to obtain good performance from the antenna.

RADIO RIDDLES

Last Month:

I asked: "In discussions of the grounded, quarterwave, vertical antenna, mention is sometimes made of a mirror image of the antenna. In technical discussions of this antenna we sometimes see this drawn as an image of the actual antenna and positioned upside down in the earth directly below the above-ground antenna. This image is used to explain how the radiated waves

interact with the ground to shape the antenna's vertical-radiation pattern. Does this image act as an underground antenna and transmit underground?"

No, there is no image antenna under the earth radiating as the antenna above-ground is doing. The image is only a geometrical technique for explaining formation of the antenna's radiation pattern. On the other hand, it is true that some antennas located a few inches, or even a few feet, underground are, at times, utilized for communication using waves that propagate to and from them through the atmosphere and the earth above them.

This Month:

In this article I've hopefully kept things relatively simple by concentrating mainly on receiving antennas. But did you know that most antenna measurements, such as reception pattern, gain, resonant frequency, and feedpoint impedance, are the same when the antenna is transmitting as when the antenna is receiving? What is this commonality between reception and transmission with antennas called?

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

BEYOND Family Radio!

Stay in touch with your family and friends! The new PRYME Radio Products PR-460: SportConnect™ and PR-460: ClearConnect™ transceivers use frequencies in the General Mobile Radio Service (GMRS) to provide long range personal communications. Unlike half-watt FRS radios these new two-way radios provide a full FOUR WATTS output power.

The 8-channel PR-460: SportConnect™ model has a range of **up to 5 miles**, while the PR-460: ClearConnect™ has 23 channels including all GMRS repeater frequencies, for a range of **up to twenty-five miles** or more!

Family Radio PLUS! Family Radio users upgrading to GMRS can still communicate with their existing FRS radios! Channels 1-7 in both our ClearConnect™ and SportConnect™ are the **same as Family Radio channels 1-7**, so you can still talk with any FRS radios in your group!

FCC License Required: Operation on the General Mobile Radio Service requires an FCC issued GMRS license. Information on obtaining a license is included with your transceiver. The FCC license fee is \$80 for five years, which breaks down to a little more than \$1.00 per month. One license covers you and everyone in your immediate family, including your children and parents.

PR-460: SportConnect

8 Channels up to 5 miles range!

\$199.95*

PR-460: Clear Connect

23 Channels including repeater operation for range up to 23 miles!

\$219.95*



Range may vary due to obstructions, weather, low battery, or other factors. Access to repeaters may require a fee.

*NOTE: The prices shown above are estimated street prices. Actual dealer prices may vary.

PRYME
Radio Products

by **PREMIER Communications Corp.**

480 Apollo St. #E • Brea, CA 92821

Phone: 714-257-0300 • Fax: 714-257-0600

Web: <http://www.adi-radio.com>

Notch Filters Fight Interference

There are now over 600 NWR (NOAA Weather Radio) transmitters in the US, up from about 425 in 1999 (<http://www.nws.noaa.gov/nwr>). The government's goal is "to expand the reach of the weather radio broadcasts to 95% of the US population." However, the NWR transmitters can interfere with reception of police, fire, and other signals either by desensitizing a scanner or by mixing with signals on other frequencies and causing intermodulation. The mixing can take place either inside a scanner or externally, e.g., in a corroded joint in an outdoor antenna.

Some of my receivers experience intermodulation from both a new NWR transmitter and a commercial FM broadcaster.

◆ Notch Filters

A notch filter tuned to the proper frequency and placed between the antenna and scanner can attenuate an offending signal unless the problem exists outside the scanner. Notch filters are passive devices so they require no power source. There are a few commercial notch filters available and you can even build your own filter provided you have well calibrated test equipment.

Frequency response is the most important characteristic that distinguishes one filter from another. How much does a filter attenuate the offending signal and to what extent does it attenuate desirable signals on other frequencies?

I constructed and tested simple 1/4 wave coax stub filters in July 1998 *MT*. Unfortunately, they are a poor choice for modern-day scanning because they have a high insertion loss and exhibit additional, undesired notches at odd multiples of their design fre-

quency. In other words, a simple 1/4 wave coax stub filter will attenuate both the signals you want to reject and the signals you want to hear.

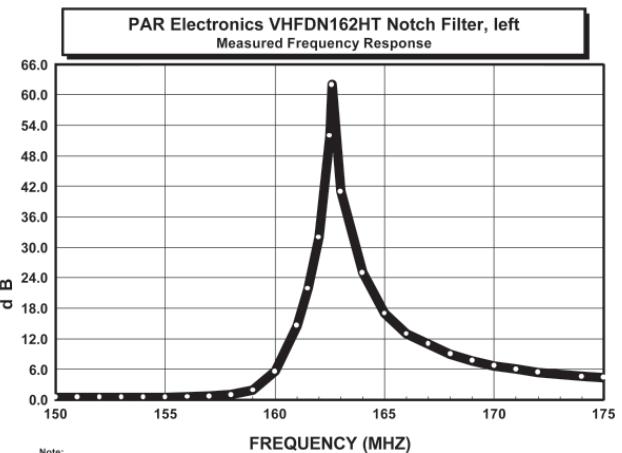
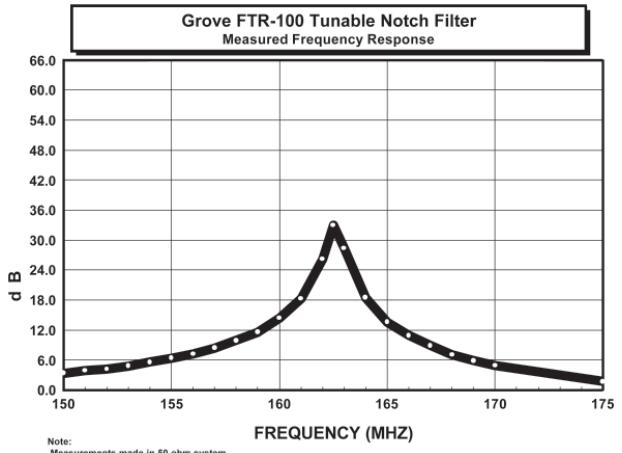
Grove Enterprises FTR-100

The FTR-100 (fig. 1) is a tunable notch filter that employs a single pole circuit to attenuate signals. The notch frequency is adjustable by means of a front panel knob and calibrations from 90 to 174 MHz. The FTR-100, which sells for about \$50, is supplied with a BNC "T" adapter and a short length of RG-58/U coax cable fitted with BNC plugs. The adapter attaches to a single BNC jack on the rear panel, and the coax jumper connects the filter to the receiver. The antenna feedline connects to the other side of the adapter.

I was impressed with the FTR-100's construction. The resonant circuitry is built in a rigid metal box inside a solid wood cabinet, reminiscent of fine furniture. Rubber feet on the bottom prevent scratches to the table surface.

PAR Electronics VHF DN162HT

I contacted PAR Electronics to borrow two filters; one to reject NWR signals in the



Grove Enterprises FTR-100



PAR Electronics VHF DN162HT

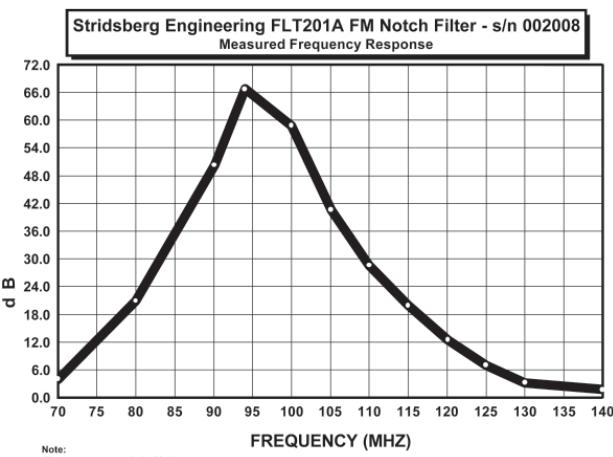
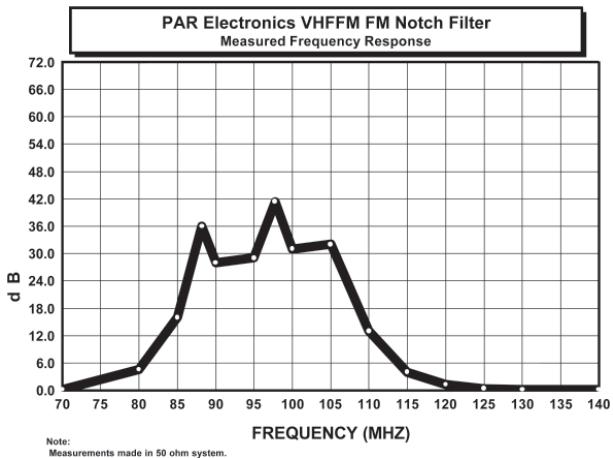
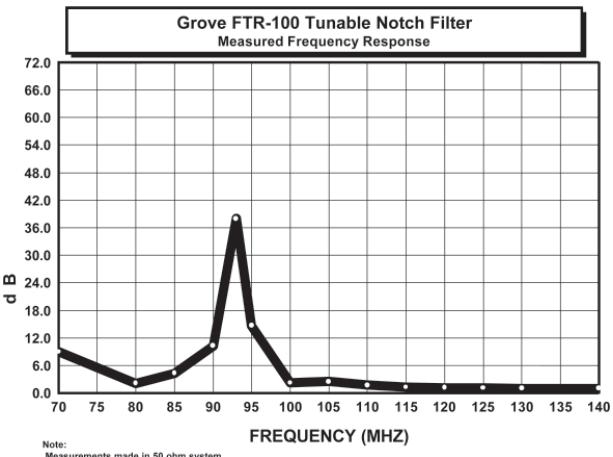
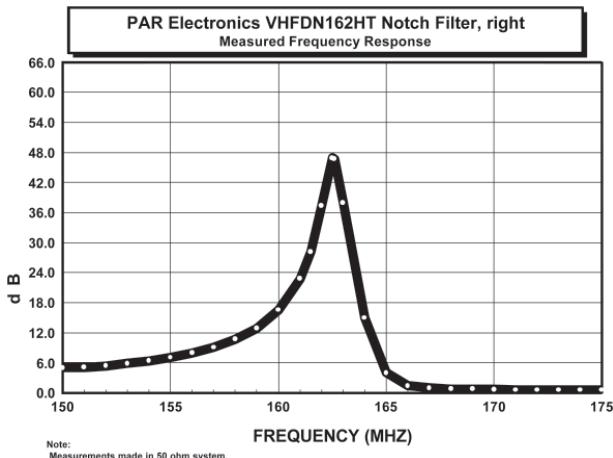
162 - 163 MHz range and another to reject commercial 88 - 108 MHz broadcasters. PAR sent their VHF DN162HT filter (fig. 2) and a model VHFFM filter (fig. 3). The street price for these filters is about \$70 apiece.

Each filter is housed in a rugged metal case. The smaller VHF DN162HT looks just like PAR's 152 and 454 MHz models reviewed in July 1998 *MT*. Each PAR filter is fitted with a BNC plug and jack so it can be mounted directly to a scanner without using a coax cable jumper.

The PAR filters are not designed to be tunable by the user, though the VHF DN162HT is fitted with a 2-position switch that changes the filter response.

◆ Performance

I tested the Grove and PAR Electronics filters in the lab, employing a digitally tuned



HP spectrum analyzer and tracking generator, and in actual use, with a Yaesu VR-500 portable scanner connected to an outdoor Antenna Specialists AV-801 antenna.

The first goal was to knock out interference near 145.73 and 156.93 MHz from WSPY, a 107.1 MHz commercial FM broadcaster. Both the Grove FTR-100 and the PAR VHFFM filters eliminated the interference completely. The FTR-100 adjusted easily despite my initial concern that it might have hair trigger tuning.

The next problem was on 156.83 and 157.05 MHz, where the VR-500 heard a mixture of 162.4 MHz NWR and digital paging signals. Both the PAR VHFDN162HT and Grove FTR-100 filters eliminated the mess.

As the accompanying graphs illustrate, the PAR VHFDN162HT filter is sharper than the FTR-100. The PAR filter is the more appropriate choice for attenuating NWR interference while monitoring the 160 MHz railroad allocations, for example.

The FTR-100 had under 4 dB insertion loss in other parts of the 30 - 800 MHz spectrum. However, it had 10 dB loss in the 855 - 870 MHz range and more in the 870 - 920 MHz area, so I recommend you disconnect it for listening to weaker signals above 800 MHz where NWR and FM broadcast interference is usually not a problem.

When the VHFDN162HT's 2-position switch is in the left setting, there was an undesirable 35 dB notch at 231.1 MHz and greater than 4 dB loss in the 200 - 258 MHz range and above 974 MHz. With the switch in the right position, there was more than 4 dB loss below 100 and above 974 MHz and a 10 dB loss in the 30 - 50 MHz range. I measured the insertion loss at less than 2 dB from 858 - 870 MHz in either switch position. I recommend you keep the switch in the right position except when monitoring below 100 MHz.

Our PAR VHFFM filter measured less than 4 dB loss from 30 - 80 MHz and 115 - 1000 MHz.

I measured the frequency response of a Stridsberg Engineering FLT201A FM notch filter in January 2000 *MT* and



Par Electronics VHFFM filter

reprint the graph here for comparison with the VHFFM and FTR-100 filters. The \$42 Stridsberg filter was best at attenuating FM broadcast signals, but was wider than the other two filters, so it impacted aeronautical signals below 125 MHz.

◆ Overall

The FTR-100 filter is the most flexible because it is tunable from 90 - 174 MHz. The more expensive PAR filters exhibit less insertion loss and may be kept in line when listening above 800 MHz. The Stridsberg Engineering FLT201A FM notch filter is considerably cheaper than the PAR VHFFM, attenuates FM broadcasters more deeply, but can impact VHF aero monitoring below 125 MHz.

CONTACT INFO

Grove Enterprises

7540 Highway 64 West
Brasstown, NC 28902-0098
Tel. (800)438-8155
<http://www.grove-ent.com>

Par Electronics

P. O. Box 645
Cullowhee, NC 28723-7435
Tel. (828)743-1338
<http://www.parelectronics.com>

Stridsberg Engineering

354 Albert Ave.
Shreveport, LA 71105
Tel. (318)861-0660
<http://www.stridsberg.com>

ANTENNA OPERATION

explained like never before!

Gain an understanding of why your antenna radiates and receives. "THE SCIENCE OF ANTENNAS", an enlightening book by MAX RESEARCH explains the "whys" of antennas. Easy to understand, this book is written in a clear manner so that radio hobbyists and experimenters can appreciate the lofty ideas of electromagnetic and antenna theory.

Learn why radiowaves leave an antenna and why they propagate...and why they affect a receiving antenna... and much more!

\$14.95...ppd. Orders or inquiries to
MAX RESEARCH
P.O.Box 1306, East Northport, NY. 11731

MAX RESEARCH

A Look at Bonito's RadioCom 5.1

Almost a decade ago, when I first started the Computers & Radio column, I proposed a "Total Radio Environment." Simply put, the concept was for a single piece of software which could provide all the functions a shortwave monitor would require. Keep in mind, ten years ago 35 MHz was considered a blazing CPU clock speed and state of the art. Meanwhile, I boldly proposed that this Total Radio Environment should provide radio control, logging and digital signal decoding, as a *minimum*.

If you can remember back to the PCs of 1990, you'll know that this was a very tall order; in fact, too tall. Brave software manufacturers that tried to achieve this basic combination of monitoring functions found how poorly developed the PC hardware was for these tasks. More than one software package I reviewed seemed to stop for painful periods while the hardware fought to keep up. It was not a pretty picture, and made for frustrating and unreliable computer-assisted radio monitoring.

Now, fast forward to the year 2002.

◆ The Year We Make Contact

Borrowing shamelessly from an Arthur C. Clarke novel, in this year of 2002, inexpensive computer hardware is now up to the tasks of the Total Radio Environment. HP, E Machine and other PC manufacturers are offering quality products with processor speeds which were just dreams a few years ago – so high we associated them with UHF frequencies!

Now that a PC of this power is commonly available, Bonito has introduced their latest ver-

sion of RadioCom 5.1 (release 2), which does everything I imagined a decade ago ... and much, much more! All this power comes at a price that is higher than usual, but may be justified.

RadioCom 5.1's minimum requirements are not all that tough in 2002: Intel Pentium/Celeron with 200 MHz or better, Color Graphic min.16 Bit Colors, Screen Resolution: 1024x768, 16 bit bi-directional Soundcard with Line In and Windows 95/98/ME/2000 or NT 4.0 SP3. However, if you want to display all the various screens and tools simultaneously, I suggest a Pentium 300 MHz as the minimum CPU. I used RadioCom 5.1 on a Pentium II 300 MHz machine with 64 MEG of RAM.

Since the program comes on a CD-ROM, your system will also need to include a CD drive. A free serial port is required for receiver control. The number of radios that RadioCom can control is around eighty! The ICOM list alone is over twenty. For this overview I used it with an ICOM IC-PCR 1000 receiver.

◆ No Jolly Rogers, Please

Loading is fast and effortless. However, I recommend you write down the number printed on the CD. This number must be typed into the opening screen correctly before you will be allowed to load the program on to your hard drive.

This is Bonito's first level of software protection.

A hardware dongle is another level of security that safeguards RadioCom from unauthorized users. A dongle is a hardware device, which can range from a microcontroller to a few resistors, that is attached to the serial port. When the program is loaded it "looks" for a "coded" output, or specific arrangement of these devices on the serial bus. If it does not find the hardware, the program will not run.

RadioCom's dongle, which they call a "switchbox," is connected

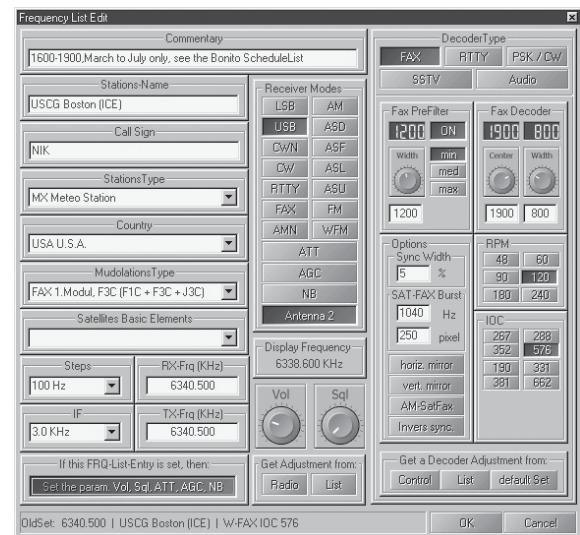


Figure 2 – A Logging "Card". Just Look At The Wealth Of Data; Much Computer Controlled!

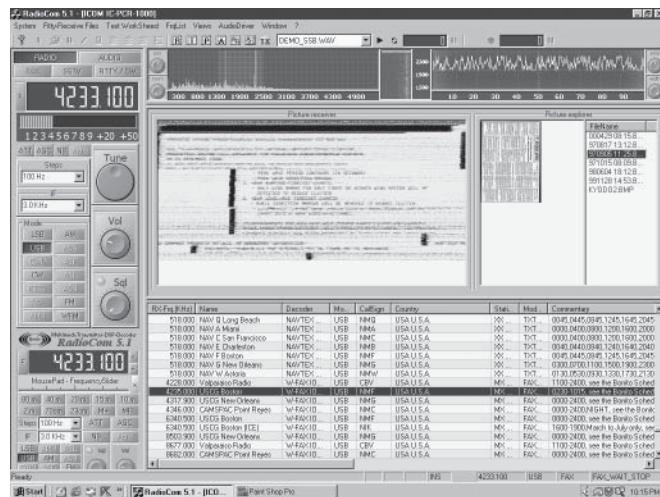


Figure 1 – RadioCom 5.1 Screen Displaying Radio Control Function on Left, FAX Decoding on Right & Logged Stations At Bottom.

to the computer's serial port. The receiver's serial control line is then connected to the other side of the switchbox.

◆ Navigating the Screens

Figure 1 shows the impressive RadioCom 5.1 screen in one of many user selectable modes. The left side of Figure 1 is configured using the "Radio" format. On the top left side we can control all of the basic receiver functions such as frequency, mode, IF width, tuning step, volume and squelch, if the radio is so equipped.

The lower left side repeats some of the same controls but is geared to ham applications with preset buttons for quick tuning to the ham bands, such as the ever popular 20 meters.

◆ Lots of Ways to Tune

Receiver tuning can be achieved in a number of ways. The first is using the Up/Down buttons to the right of the digits of the frequency display. You can also use the mouse to select and change digits. Or, you can click the "F" to the left of the digits and then enter the frequency via the keyboard. Finally, the "MousePad-Frequency Slider" is a unique tuning method that takes a little practice to use.

◆ Seamless Signal Decoding

The right side of RadioCom 5.1 can be set independently of the left side. The right is tailored to decoding different types of signals.

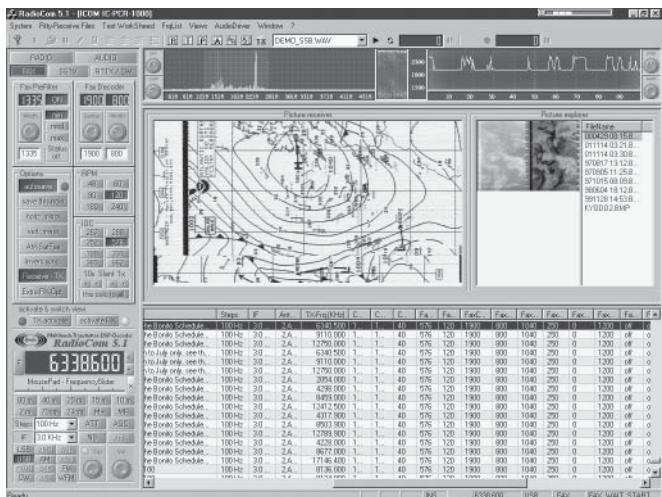


Figure 3 – Off Air FAX Being Received by RadioCom 5.1

RadioCom 5.1 is capable of decoding RTTY, CW, FAX, SSTV, PSK (PSK31, Q- and B-PSK), NAVTEX, SITOR B, SSTV and Synop signals. No additional hardware or software is required. It's all built into RadioCom (as it should be).

Six different pre-programmed right-side views are selectable from the top menu depending on the type of monitoring that is being performed. In Figure 1 the Typical Image Receiver View is being displayed on the right side of the screen.

The bottom section of this screen displays the station log. In this case we can tune our receiver to USCG Boston on 4235.000 kHz just by left clicking on this entry.

◆ Complete Logging and Control

Let's take a closer look at exactly what data can be logged and controlled via a user entry. Figure 2 shows the very comprehensive data that is stored for recall for each log entry. RadioCom comes preloaded with a nice log of worldwide digital signal stations.

For this entry we are looking at USCG Boston as seen from the logging edit entry screen. Since it is a FAX station, we have chosen FAX as the Decoder Type. Now all the FAX parameters, IOC, RPM, Center Frequency and more can be

set and logged. Once all this station and decoder data is logged, clicking on the entry not only tunes your receiver, but it also chooses the decoder type and decoder parameters. It makes digital signal monitoring so automatic and easy: I love it!

◆ Just the FAX

Figure 3 shows the RadioCom 5.1 set up for serious FAX monitoring. It's again USCG Boston. But this time it's a FAX transmission on 6338.600 kHz.

Since we have chosen the FAX mode, the top left

side now shows all the user-controlled FAX decoder settings as entered in the log for this station. The resulting FAX can be seen as it is being received in the center of Figure 3, above the log entries.

Completing this configuration of the FAX station display, at the top center-left is the received audio spectrum of this FAX signal. Note the peak, centered about 2200 Hz. To its right we can see the audio scope clearly showing the pulses of FAX signal.

I must say that I have never used software that made FAX monitoring so easy and enjoyable.

The RTTY and CW decoders have their own screen with parameters unique to these modes. Their operation was just as easy and pleasurable as the FAX decoder. A nice feature of the RTTY decoder is its ability to "translate" weather reports in the SYNOP format to plain language.

◆ Digital Audio Filters and Analysis

RadioCom 5.1 has a built-in suite of digital audio filters. In Figure 4 we have selected the Audio configuration. On the left side of Figure 4 we can see filters for the audio, including an equalizer capability. The user can choose to place the

equalizer before or after the decoder and manipulate the filters in other ways.

A very nice group of audio instrument displays, such as the Dual Channel Audio Oscilloscope and the Audio and Frequency Analyzers, round out the capabilities of RadioCom 5.1.

◆ What Have We Missed

RadioCom 5.1 has many other features, such as an audio recorder, graphical satellite tracking screen and 3D scanner, to name a few. All were tried and worked flawlessly.

◆ Summary

Teamed with a typical low-end personal computer for year 2002, RadioCom 5.1 surpasses all the expectations I had ten years ago for the Total Radio Environment. If you are an HF utility monitor, you should take a serious look at RadioCom 5.1.

The program comes in two versions: one for monitoring only and a second for hams with transmit capability. The U.S. price for the SWL version is \$169.96 plus shipping from Grove Enterprises (<http://grove-ent.com> or 800-438-8155). It's also available in the U.S. from Computer International at <http://www.computer-int.com>, or overseas from Bonito at <http://www.bonito.net>.

Now, just imagine what the next decade of electronic development will bring us. Let's hope the next decade also brings peace and justice to all the people of Earth. Happy 2002 to all.

Software for the Shortwave Listener...

SWBC Schedules	- Broadcast frequencies and programs, updated weekly+	\$35/year
Smart R8 Control	- Smart control for the Drake R8/R8A/R8B	\$25/mo/\$40ann/\$60year
Smart Icom Control 32	- for IC-R75	\$60/year
Smart NRD Control 32	- for NRD-535/545	\$60/year
Smart Kenwood Control 32	- for R-5000	\$60/year
Smart Lowe Control 32	- for HF-150	\$60/year
Smart Audio Control	- Audio scope and spectrum analyzer for your PC	\$25/mo/\$35/year
SWBC Interval Signals	- Turn your PC into a virtual shortwave receiver	\$5/mo/\$30/year

FineWare

11252 Cardinal Drive * Remington, VA 22734-2032
fineware@fineware-swi.com * www.fineware-swi.com

RadioCom® DSP-filter analyzer, CAT with decoder of RTTY, Synop, CW PSK31, FAX and SSTV. CAT for more than 80 receivers and transceivers.

BuTel-ARC® Controll software for ICOM (R2, R3, R10) and AOR (AR8000, AR8200, AR8600, AR5000)

Wavecom® Professional real time data decoder/ analyzer/ processor of radio communication transmissions, Audio-IN, variable IF-interfaces, all major HF, VHF, UHF, SFH and SAT modes/ codes.

ARMAP and **HAM-Label**

Logbook and QSL design.

PCCardBox® = ISA or PCI card BUS to PCMCIA. Use your ISA or PCI-card with your laptop. Works with Wavecom decoders and other internal radios.

COMPUTER INTERNATIONAL

St. Johns, MI 48879-1903

Tel/Fax: 1 877 977 6918

info@computer-int.com

www.computer-int.com

All major credit cards accepted

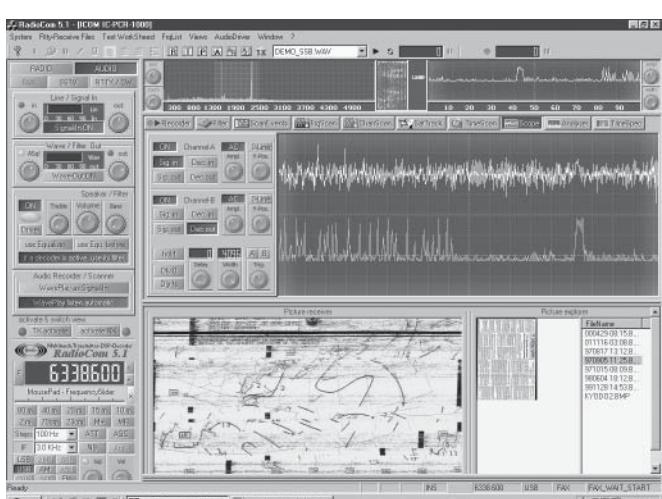


Figure 4- A Look at Some of the Received Audio Analysis Tools

Build a Scanner Repeater

by Jerry Reed

One of the most frustrating things for the scanner enthusiast is finding time to actually sit down and listen in these busy times. If you have a shiny new handheld scanner, you can squeeze in a few minutes more listening while working around the house or tinkering in the garage. But, if you're like me and your main scanner is as old (and as heavy) as my beloved PRO-2004, you know portable scanning isn't always an easy option.

Fortunately, there's an easy way to make even boat-anchor scanners portable. Here's how to modify an inexpensive wireless "baby monitor" to make a practical repeater for your scanner. A conventional ham repeater listens on one frequency and retransmits what it hears on another. This scanner repeater listens to the audio from one or more scanners and retransmits it to any location in your house. All that's required is a little soldering and a handful of readily available parts.

This scheme has advantages even if you have a portable, high-tech scanner, since repeating scanner audio over the wireless monitor link lets you station the scanner near outside antenna connections and away from interference sources. It also lets you combine scanners and listen in more than one location simultaneously, if needed.

◆ How it works

Commonly sold as wireless room monitors, these devices connect a sensitive condenser microphone to a low-power FM transmitter. These operate license-free in the 49 MHz band,

share frequencies with walkie-talkies and transmit to a portable receiver. In theory you could just turn up the volume on your scanner, place one of these room monitors alongside it, and listen in on the receiver from any other room. However, bypassing the microphone and forging a direct connection from your scanner's audio output to the input of the room monitor has a number of advantages.

First, a direct connection from scanner to the transmitter input avoids problems with ambient noise. This works two ways. With the modified room monitor fed directly from the earphone jack of the scanner, room noise doesn't enter the link. Nor does the scanner audio blast out into whatever room contains the scanner. This is particularly useful if your scanner is located in the bedroom and you're doing some late night listening in the garage.

Second, I don't know about you, but I don't particularly want to bug my home with an open mike. Those of you who have ever monitored these frequencies in the 49 MHz band know how this works. Disconnecting the built-in mike and replacing it with a simple patch cable to the scanner audio output avoids this problem.

◆ Materials

Obviously you need the room monitor. Luckily these are inexpensively available lots of places. The monitor pictured in this article was a clearance item I picked up at a local Radio Shack for about \$10. Other monitors can be acquired on sale from major retailers, or they can often be found at garage or yard sales for pennies on the dollar. Features to look for include AC adapters as well as battery power, rechargeable batteries and perhaps earphone jacks on the receiver.

Table 1 details the parts and tools you'll need.

The resistor and capacitor are used to isolate the monitor from the scanner; the patch cable to connect the scanner audio to the monitor and the attenuator may be needed to adjust the comparatively high output level of the scanner earphone jack to the sensitive monitor input. An assortment of heat shrink

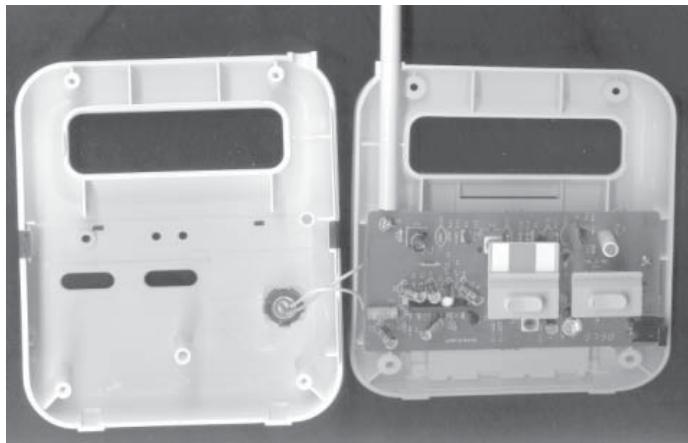


Fig 1: Inside view of the room monitor. The mic is the small circular object on the left half of the photo. Note the wires running to the PC board at right.

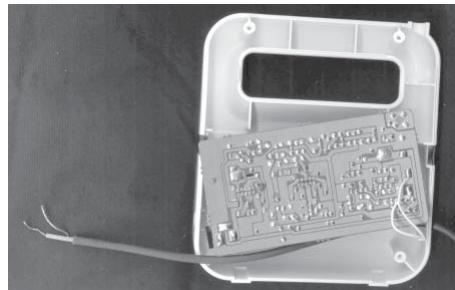


Fig 2: PC board removed, and audio cable fed through housing.

tubing helps do a neat and reliable job. Get an audio cable with "pig-tail" leads on one end, since we'll need to solder that end to the PC board.

◆ Step by Step

Open the room monitor case. (Save the screws.) *Figure 1* shows a typical configuration. The microphone is the small circular object in the left-hand shell. On some monitors the microphone may be soldered directly to the circuit board, on others it may be connected by colored wires, as in the model illustrated in this figure.

Now drill a small hole in the case, and feed the patch cable through. Choose the location so that there will be room to replace the circuit board without crimping the cable unduly. If there is sufficient room, tie a single knot in the cable on the inside of the hole to provide strain relief. *Figure 2* shows how this may look.

Locate the point on the printed circuit board where the microphone connects. *Figure 3* shows a typical arrangement.

Note which one of the two wires from the microphone goes to the ground portion of the printed circuit board. This can best be accomplished by following the traces to see which of the two connections eventually leads to the negative battery lead. Knowing which of the microphone connection points leads to the "ground" portion of the monitor circuit board is useful for determining where to

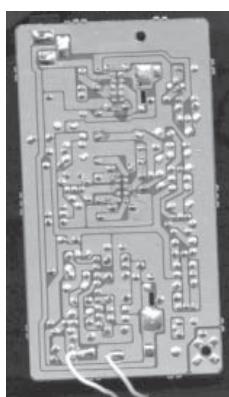


Fig 3: Typical PC board. Note the mic connections at the bottom.

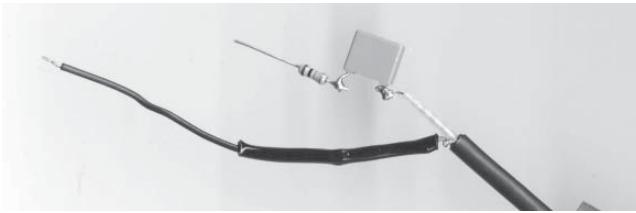


Fig 4: The resistor, capacitor and ground lead extension soldered to the audio cable. Note the use of heat shrink tubing to insulate the braided ground lead from the center conductor and resistor/capacitor combination.

connect the ground braid from the patch cable.

Desolder the microphone leads. No elaborate technique is required – just heat each connection with the soldering iron, and gently tug the wire free with your pliers. If any solder bridges to an adjacent trace, just reheat the connection and use a wooden toothpick to brush away the excessive solder.

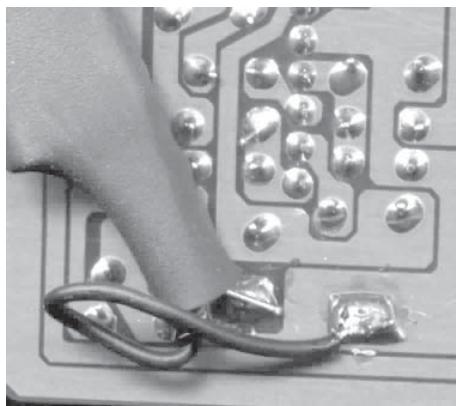


Fig 5: Close-up of the PC board, showing the audio cable connection replacing the mic leads. The resistor/capacitor connection has been completely insulated with heat shrink tubing before soldering.

Now it's time to prepare the business end of the patch cable. First, slip a larger diameter piece of heat shrink over the patch cable inside the monitor housing. This will be used to insulate the entire connection from accidental contact with the printed circuit board after assembly is complete.

Next, slip a smaller diameter piece of heat shrink tubing over the braided conductor of the patch cable. This will be used to insulate the bare braid from accidental contact with the resistor and capacitor on the other conductor. It may be useful to attach a short piece of insulated wire to the bare braid to allow easier eventual connection to the printed circuit board.

Solder the resistor and capacitor in series with the center conductor of the patch cord. Keep the leads as short as you can. Figure 4 shows how this will look.

Slide all the heat-shrink tubing pieces into place and use your heat gun or hair dryer to shrink them down. Correctly positioned, only the tip of the resistor wire and of the braid should extend beyond the tubing.

Solder the prepared leads from the patch cable to the microphone connections on the printed circuit board. Connect the braid or the

braid wire to the terminal that leads to the negative battery terminal, if this can be determined. Figure 5 shows the result.

Test the transmitter before assembling the case. Put in the battery, turn on the receiver that came with the monitor, and bridge a wire across the other end of the patch cable. You should be rewarded with loud clicks in the receiver. If this doesn't work, check carefully for cold soldered joints, solder bridges, or shorts within your cable at the connections between the resistor, the capacitor, the braid and the wire.

Carefully routing the cable within the enclosure, reassemble the monitor.

Now test it again. Connect the scanner to the input cable through the attenuator. Tune the scanner to an available signal (NOAA weather works well), turn down the squelch and gradually increase the volume. You should hear the scanner audio in the room monitor receiver.

◆ Operation

One of the most flexible things about the scanner repeater is that it's easy to combine the output of two (or more) scanners and feed the composite signal to your remote monitor. Figure 6 shows how I have two of my old scanners hooked up.

One scanner is an old Radio Shack PRO-33 that scans the local intercity law enforcement channels. These channels don't get a lot of traffic, but when they do activate, it is always interesting, as something big is usually going on if the local jurisdictions need to interoperate.

The second scanner is the venerable PRO-2004 and is programmed to scan local air and rail frequencies. These get quite a bit of traffic dur-

Materials

10k resistor, 1/4 or 1/2 watt. (Brown/Black/Orange/Gold)
.1 mfd capacitor, 25 WVDC or greater.
Audio patch cable, RCA Male to pigtail, any length. (Radio Shack #42-2372 or similar)
Heat shrink tubing (variety of sizes)
6 inch piece of #18 insulated wire (actual length and gauge approximate)
Rosin core electronic solder
Audio attenuator (Radio Shack #274-300 or similar)

Tools

Pencil-type soldering iron (about 15-30 watts)
Pair of wire pliers for cutting and stripping
Small drill
Hot air paint stripping gun or hairdryer for shrinking the tubing
Small Phillips head screwdriver for opening the room monitor

ing the daylight hours. When listening to the combined feed, most of the time you get the output from the second scanner, but if something does happen on the intercity channels, you can find out quickly.

Shown at *a* in Figure 6 is an attenuator that matches the earphone output from the PRO-33 into the relatively sensitive input of the modified room monitor. Since I'm combining scanners, a simple "Y" cable is shown at *b*, and the connection to the modified room monitor is shown at *c*. Because the PRO-2004 has a line-level output, it doesn't need an attenuator to connect to the transmitter.

Remember not to program the scanner to either of your room monitor output frequencies (49.860 and 49.890 MHz in this case) unless you want to hear some really ugly feedback.

Whether you're remoting one scanner or several, I think you'll find the flexibility and convenience of the scanner repeater will add to your listening enjoyment. Happy scanning.

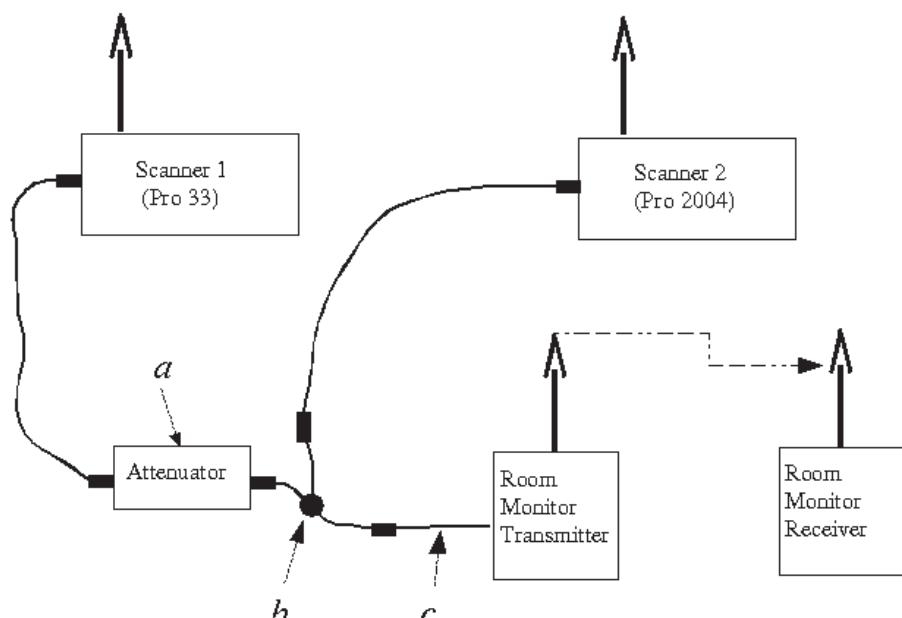


Fig 6: Connecting the scanner repeater to multiple scanners. If you're only using a single scanner input, the "Y" cable can be omitted. Scanners with line-level outputs will not need the attenuator.

Midland's Neat WR-10 AM/FM Weather Radio

To paraphrase a scatological bumper sticker: "Stuff" Happens. Sometimes, *very bad* stuff happens. When it does, whether it is caused by people with evil intent or an occurrence of nature, it is always good to have as much warning as possible.

For that reason, in January 1975, a White House policy statement designated NOAA (National Oceanic and Atmospheric Administration) Weather Radio as the sole government-operated radio system to provide direct warnings into private homes for both natural disasters and nuclear attack.

NOAA currently broadcasts weather information 24-hours a day on more than 480 FM transmitters in 50 states, Puerto Rico, the Virgin Islands, Guam, and Saipan. NOAA Weather Radio also broadcasts warnings, as well as post-event information, for all types of hazards – both natural (such as earthquakes, tornados, or volcanic activity) and technological (such as chemical releases or oil spills). While, to my knowledge, NOAA Weather Radio has not yet been used to provide warning of terrorist attacks, it certainly wouldn't surprise me to see it employed for that purpose. (Such a change in the "tasking" of Weather Radio might even be in place by the time you read this. The email version has already been used to carry such national warnings.)

Seven frequencies are used: 162.550, 162.400, 162.475, 162.425, 162.450, 162.500, and 162.525 MHz. NOAA's goal is to provide weather radio coverage for 95 percent of the U.S. population. Right now, an estimated 70-80 percent of the population is within range of a NOAA weather radio station. No matter how you slice it, NOAA Weather Radio is one of the very best returns we get from our tax dollars.

The bottom line is that you owe it to yourself – and the people that you care about – to have a NOAA Weather Radio receiver in your house. If you don't have one, get one. If your Mom or your Dad or

Grandma or your significant other doesn't have one, give them one. Make sure you get one with alert capability. It can sit there silently monitoring for an alert signal from the NOAA transmitter. When it gets the alert tone, it will let you know that "something's up."

◆ Midland's All-in-One

Another essential piece of gear that every household should have is a portable AM/FM radio that can operate off battery power. That's where the Midland's new weather radio comes in. Its official title is a mouthful: "Model WR-10 7 Channel Weather/Hazard Alert Monitor with AM/FM Radio."

The WR-10 allows you to listen to your favorite AM or FM radio broadcast as it continues to silently monitor the local NOAA Weather Service broadcast in the background. The instant that it receives a thunderstorm, tornado, flood, fire or other severe weather or hazard alert, it automatically turns on a flashing LED and/or high volume warning tone, then switches reception to the NOAA broadcast for more details.

The WR-10 measures 8-5/8" W x 1-1/2" H x 6-1/4"D. The case is an attractive gray plastic. On the top of the case, there is a grill for a top-firing speaker, a red light-emitting-diode, and three buttons. The WEATHER bar button activates the weather receiver so you can listen to NOAA's 24-hour weather broadcasts. The ALERT bar button turns off the

weather radio broadcasts and turns on monitoring of the emergency alert system. It also acts as the ON switch for the AM/FM radio. The alert TEST bar button allows you to make sure that the WR-10 can receive an emergency alert broadcast.

On the left side of the WR-10, you find a switch for selecting weather, AM or FM tuning and a slide-rule tuner for AM and FM broadcasts. On the back of the WR-10 is a telescoping antenna that extends about 12-1/2 inches. On the right side of the case is a ON/OFF/VOLUME thumbwheel, a jack for an external antenna, a jack for an external alert device such as a strobe light, and a jack for the 110 V wall adapter (included.) The WR-10 can also be operated from an optional extra-cost vehicle adapter. On the bottom of the unit, you discover a switch for selecting one of the seven NOAA weather frequencies to receive, a switch for selecting alert mode (LED, siren, or voice-only), a reset button, and a hatch for the 9V DC back-up battery.

If you want the WR-10 to silently monitor for alerts without listening to AM or FM broadcasts, there's a trick: set the tuning switch on the left side to WX and press the ALERT button. Do NOT turn the thumbwheel on the right side to OFF – that turns everything off, including the ALERT function.

I liked the WR-10 a whole lot. It offered clear reception of my local NOAA weather radio station and good reception of local AM and FM stations. Even better, with the 9V back-up battery installed, it will operate during a power outage or as a temporary portable radio for six to eight hours.

The expected street price of the WR-10 is very reasonable: just \$34.95. If you live in an outlying area and want to improve the quality of your weather radio reception, or if you want to take advantage of the WR-10 in a vehicle, the 18-259W Thru Glass VHF Weather Antenna is available for a street price of around \$19.95.



The Midland WR-10 offers NOAA Weather Radio, alert capability, and AM/FM reception in a neat package.

MT



REVIEW

I recently discovered that a storage shelf in my radio repair shop bristled like a porcupine with whip antennas of various sizes that I had accumulated over the past couple of years from yard sales, flea markets, and dealer samples. I had single- and dual-band ham whips, cellular antennas, and even scanner models. How would they compare for general purpose scanner monitoring? I wondered.

With my car in an open driveway and an AVCOM PS37D spectrum analyzer at my disposal, I decided to sweep the major monitoring bands, measuring relative signal strengths as I alternately placed each antenna in the center of my car roof. The results were quite surprising.

Admittedly, this is not a consummate scientific test, but it does show that there are differences among antennas, some subtle and some profound. And price is not always a consideration.

I discovered, for example, that some grades of coaxial cable are worse than others, with inadequate shielding causing erratic readings caused by nearby conductors like me or the car body. And predictably, antennas using thin RG-174/U coax will suffer 2-4 dB more loss at UHF than if they used RG-58/U.

It became quite obvious that the best antenna by far was the Nil-Jon "Super M"; we chose it as the standard of comparison, rating the competitors with + or - dB readings at specific frequencies.

The competitors were assigned numbers for ease of reference on the chart; here are their identifications and descriptions:

Antenna Performance Against Nil-Jon Super M

- (1) Generic 13" cellular center-loaded gain antenna with RG-174/U cable
- (2) Everhardt "Tiger" B5 14" cellular center-loaded gain antenna with RG-58/U cable
- (3) CTI Pro-Am MM144B 19" slim whip with RG-174/U cable
- (4) CTI Pro-Am MM3B 12-1/2" tri-band scanner antenna with RG-174/U cable
- (5) Grove ANT-30 19" Stealth whip with RG-174/U cable
- (6) Austin Spectra 25" dual-coil whip with RG-58/U cable
- (7) Generic 20" dual-coil high-gain cellular antenna with RG-174/U cable

* Erratic reading, possibly due to defective or inadequate shielding.

— means reading too low to measure, or signal not present.

0 means equal to Nil-Jon antenna.

The Bottom Line

On low band, the only antenna that performed somewhat better than the Nil-Jon was the high-gain cellular antenna, most likely due to the aperture (electrical length) delivering more signal voltage at this frequency range.

Better 800/900 MHz performance by the first two cellular antennas could be expected since they are band-specific gain antennas. But how does this all equate to actual differences in perceptible reception?

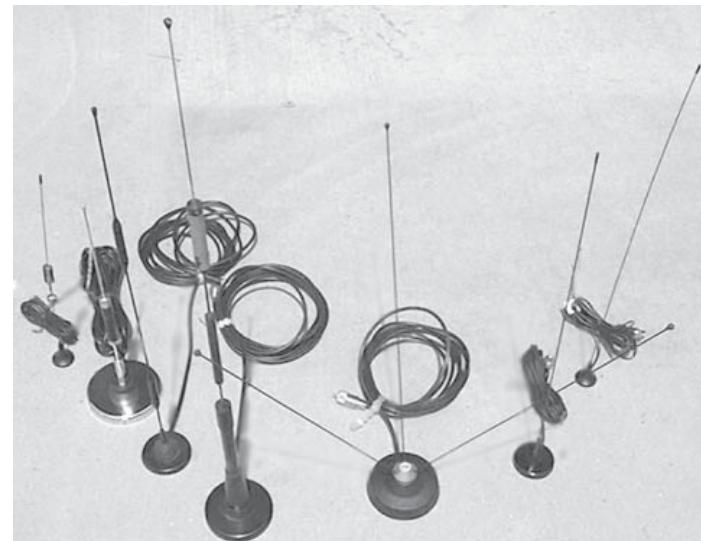
Generally speaking, a 1-2 dB difference can only be discerned under the most carefully controlled conditions, not what we hear while driving down the highway! It takes several dB – as much as 4 or 5 – to notice a difference, and then only when signals are weak enough to be competing with prevalent background noise.

For those readers fortunate enough to have S meters on their receiving equipment, one S unit is equivalent to a 6 dB change in signal level. If you are already receiving S9 signals, another 6 or 10 or 100 dB won't make it sound any better!

Magnetic-Mount Scanner Antennas....

A Comparison by Bob Grove

But when fringe signals are breaking up in background noise, a few dBs help a lot, often meaning the difference between readable copy and static-covered speech.



The contenders. The Nil-Jon Super-M, a three-element angled array, is front right.

Freq MHz	Model & dB						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
8	-3	-3	-8	-3	-6	-4	+4
50	-4	-4	-9	-5	-8	-5	+3
82	-9	—	-5	-6	-7	-9	0
102	-6	-5	-12	*	-9	-5	+3
152	-9	-9	-3	-2	-3	-2	-8
162	-5	-6	-2	-9	-3	-2	-8
410	—	-8	-9	-8	-7	-2	—
462	-14	-14	-10	-10	-10	-3	-25
494	-9	-7	-5	-3	-9	-4	—
570	+1	+1	+1	-7	-5	-13	-8
880	-2	+3	-4	0	-8	-2	-4
949	-1	+1	0	+1	-7	-9	0
992	-3	+2	—	-2	-8	—	-2

What's NEW

Tell them you saw it in Monitoring Times

Multifunction Clock/Timer Kit

It's a clock, a calendar, a scoreboard, a thermometer, and that's not all! There's a lot you can do with this kit. With its 6 x 1.4" LED digits, not only does it tell the time, it also tells the date. It can count down the time to a specific date (retirement, schools out, wedding, etc.), it can display the temperature from -20 to +70°C (or the equivalent in °F). It generates random numbers from 1 to 99, it does a dice thing, it's a chronometer with a lap function. It is a two player/team scoreboard which counts up to 199. It has a relay output (1A/24V max.) for either temperature or time alarm.

If that wasn't enough, it has a keychain remote control which is included, and memory backup with a 9V battery. Order a second remote so teams can keep their own score. Add the case for a finished look, build it into your own housing, or leave it "naked" if you like the circuit board look. This is a cool kit!

The unit measures 10" x 3.1", power supply is 12 Vdc, and it weighs a scant 0.50 pounds. The Clock/Timer Kit is \$89.95 from Ramsey Electronics (793 Canning Parkway, Victor NY 14564; 800-446-2295; <http://www.ramseyelectronics.com>).

GPS Location-Finding

The new Garmin International GPS 16 series receivers make use of precise positioning correction data derived from the Wide Area Augmentation System (WAAS) to provide accuracy of less than 3 meters.

Packaged in a low profile, wa-

terproof housing, the GPS 16 comes in a low voltage (3.3 to 6Vdc) or high voltage (6 to 40Vdc) version. The unit comes with a programmable RS-232 output port and serial input for integration into mobile computing devices or wireless communications equipment. The GPS 16 LVS or HVS is \$149 list. Contact Garmin International (1200 East 151st St, Olathe, KS 66062; 913-397-8200; <http://www.garmin.com>), for more information.

Radio Direction-Finding

WiNRADiO is offering some bold, new products. The WD3000 series radio direction finder (RDF) should have considerable impact on the government and military agencies. It is a stand-alone package which can be used with any receiver in its frequency range, although it is primarily designed for WR receivers. It will be in three versions to match the three frequency ranges of the WR3150, WR3500, and WR3700.

The first one to be released will be a mobile unit for the highest frequency range, 100 MHz-4000 MHz (4 GHz). Later versions will be for fixed base installations. The last step is to integrate GPS reception for pinpoint accuracy; it is expected that this will be a software upgrade, backward-compatible with existing radios. The fixed base system will be networkable so that it can integrate information from other RDF sites in order to triangulate signals for absolute location rather than simply taking directional bearings.

For more information, contact Grove Enterprises (7540 Hwy 64 W, Brasstown, NC 28902; 800-438-8155; <http://www.grove-ent.com>)



IRCA Mexican Log

The *IRCA Mexican Log*, 7th Edition, lists all AM stations in Mexico by frequency, including call letters, state, city, day/night power, slogans, schedule in UTC/GMT, formats, networks and notes. The call letter index gives call, frequency, city and state. The city index (listed by state, then city) includes frequency, call and day/night power. The log has been completely updated from the 2000 edition and carefully cross-checked. This is an indispensable reference for anyone who hears Mexican radio stations.

Size is 8-1/2" x 11" and three hole punched for easy binding. Prices: IRCA/NRC members - \$9.00 (US/Canada/Mexico/sea mail), \$10.00 (rest of the Americas airmail), \$10.50 (Europe/Asia airmail), \$11.00 (Australia/New Zealand airmail). Non-members: add \$2.50 to the above prices. To order the *IRCA Mexican Log* from the IRCA Bookstore, send the correct amount (in US funds payable to Phil Bytheway) to: IRCA Bookstore, 9705 Mary NW, Seattle WA 98117-2334

Latin American Radiostations

Max van Arnhem shared highlights of his 31 years of DXing to the Benelux DX Club in the Netherlands. Many audience members asked if he would consider producing a CD with audio files of some of the stations he had received over the years. Max decided to focus on radio stations from Latin American countries, as he had a large collection of recordings from this area.

The CD consists of 371 wav-files, which can be opened in Mediaplayer or Realplayer. These include station identifications, announcements and jingles, received and recorded during DX sessions in the Netherlands and on location between 1975 and 2001. Many of these stations are no longer audible on the tropical bands, at least not at large distances.

The CD Rom can be ordered by sending 30 Dutch Guilders, 15 Euro, or the equivalent for delivery within Europe; outside Europe send

Cell Towers

Wireless Convenience? or Environmental Hazard?



Proceedings of the "Cell Towers Forum" State of the Science/State of the Law

Edited by B. Blake Levitt
FORUM SPONSORS: The Berkshire-Litchfield Environmental Council • The Nature Conservancy (Northeast) • Innovative Valley Association • Bensenville Natural Resources Council • Onion Creek • Stream Audubon • Scenic Hudson, Inc. • Lake Watch Educational Institute • E.F. Schumacher Society

15 US Dollars (includes postage), to Max van Arnhem, Brink 9, 6852EE Huissen, the Netherlands. For questions and/or remarks, email mvarnhem@wxs.nl

Cell Towers

Wireless Convenience? or Environmental Hazard? That is the question posed by a new book offered as a resource to zoning boards and local neighborhoods as they struggle with making decisions about cellular tower siting. The 350-page, soft-bound book contains reports from the "Cell Towers Forum" State of the Science/State of the Law conference sponsored by the Berkshire-Litchfield Environmental Council, which was successful in attracting leading scientists and legal experts not often available at the local level. Unlike the forum the Council hosted in 1997 on planning and zoning regulations, this forum focused on health and safety issues and other concerns swept under the rug by Congress in the 1996 Telecommunications Act.

Following an introduction outlining the history of the problem and the current state of affairs by editor Blake Levitt, the book includes chapters by members of the Environmental Protection Agency, The Federal Communications Commission, the U.S. Fish and Wildlife Service, RF engineers, and noted researchers, such as Henry Lai, PhD. There is also a detailed roundup of telecom legal cases, suggestions for sensitive siting issues, and sample language for zoning regulations. The appendices provide

HERE'S WHAT OUR READERS ARE SAYING ABOUT MT EXPRESS:

"No doubt about it, the future is here! Sure nice to get the magazine so early, this has got to be the way! Thanks for a great job!"

- Charles (Chuck) Boehnke
Keaau, Hawaii

"You and the MT staff that put this project together have done a FANTASTIC job. You would seem to be the leaders in the field presenting material in this manner so it can be archived so easily. This is the way to receive a magazine."

- Don Nauer

INDEX OF ADVERTISERS

Antique Radio Classified	77
Antique Wireless	77
AOR	Cover II
Borel Manufacturing	27
Communications Electronics	73
Computer Aided Technologies	9
Computer International	83
Grove Enterprises	13,15,23
ICOM	Cover IV
John Figliozzi	69
Kevin Carey	11
KIWA Electronics	7
Klingenfuss	19
Max Research	81
Monitoring Times	3,91
Passport	Cover III
Popular Communications	28
Premier Communications	79
Radioworld Inc.	67
Skyvision	19
Small Ear	69
Small Planet Systems	69
Universal Radio	75
Viking	11
W5YI	75
WiNRADiO	1
World Radio TV Handbook	5

Clip and mail this ad along with your payment or call us to subscribe or renew to Monitoring Times!

Subscribe to MT for as little as \$14.00 (U.S. Second Class Mail)



7540 Hwy. 64 W.; Brasstown, NC 28902

1-800-438-8155 US and Can.; 828-837-9200; Fax 828-837-2216
e-mail order@grove-ent.com

	6 months	One Year	Two Years	Three Years
US Rates	<input type="checkbox"/> \$14.00	<input type="checkbox"/> \$25.95	<input type="checkbox"/> \$49.95	<input type="checkbox"/> \$73.95
US 1st Class	<input type="checkbox"/> \$29.50	<input type="checkbox"/> \$56.95	<input type="checkbox"/> \$111.95	<input type="checkbox"/> \$166.95
Canada Surface*	<input type="checkbox"/> \$21.00*	<input type="checkbox"/> \$38.50*	<input type="checkbox"/> \$73.95*	<input type="checkbox"/> \$109.95*
Foreign International*	<input type="checkbox"/> \$30.00*	<input type="checkbox"/> \$57.50*	<input type="checkbox"/> \$112.95*	<input type="checkbox"/> \$168.50*
Electronic Subscription		<input type="checkbox"/> \$19.95	<input type="checkbox"/> \$38.90	<input type="checkbox"/> \$57.85

*All payments must be in U.S. Funds drawn on a U.S. Bank!

Name _____ Address _____

City _____ State _____ Zip _____ - _____ Country _____

CC# _____ Exp. Date _____

Signature _____

If you are currently a subscriber to *Monitoring Times*, please check your label to determine the expiration date of your subscription. **MasterCard, Visa, and Discover Card accepted!**

EDITORIAL STAFF

Correspondence to columnists may be mailed c/o *Monitoring Times*; any request for a reply should include an SASE.

Frequency Manager	Gayle Van Horn	gayle@webworkz.com
Frequency Monitors	Mark J. Fine	mark.fine@fineware-sw1.com
Program Manager	John Figliozzi, KC2BPU	jfiglio1@nycap.rr.com
American Bandscan	Doug Smith, W9WI	w9wi@bellsouth.net
Antenna Topics	W. Clem Small, KR6A	clemsmall@hotmail.com
Ask Bob	Bob Grove	bgrove@grove-ent.com
Beginner's Corner	Ken Reitz, KS4ZR	ks4zr@firstva.com
Below 500 kHz	Kevin Carey, WB2QMY	wb2qmy@arrl.net
Bright Ideas	Gary Webbenhurst	ab7ni@arrl.net
Closing Comments	Bob Grove	bgrove@grove-ent.com
Communications	Rachel Baughn	mteditor@grove-ent.com
Computers and Radio	John Catalano	j_catalano@conknet.com
Digital Digest	Stan Scalsky	sscalsk@mail.ameritel.net
	Mike Chace	mike@chace-ortiz.org
Easy Access Radio	Jock Elliott KB2GOM	lightkpr@nycap.rr.com
Federal File	Larry Van Horn, N5FPW	larry@grove-ent.com
Letters to the Editor	Rachel Baughn	miteditor@grove-ent.com
Milcom	Larry Van Horn, N5FPW	larry@grove-ent.com
On the Ham Bands	T.J. Arey, N2EI	tjarey@home.com
Outer Limits	George Zeller	georgez@nacs.net
Plane Talk	Jean Baker, KIN9DD	jeanieandbob@earthlink.net
Programming Spotlight	John Figliozzi, KC2BPU	jfiglio1@nycap.rr.com
QSL Corner	Gayle Van Horn	gayle@webworkz.com
Radio Restorations	Marc Ellis	mfellis@enteract.com
Satellite Radio Guide	Robert Smathers	roberts@nmia.com
Scanning Canada	John Corby, VA3KOT	johndavidcorby@yahoo.com
Scanning Equipment	Bob Parnass, AJ9S	parnass@megsinet.net
Scanning Logs	Larry Van Horn, N5FPW	larry@grove-ent.com
Scanning Report	Robert Wyman	wymanent@bellsouth.net
SW Broadcasting	Glenn Hauser	wghauser@yahoo.com
SW Broadcast Logs	Gayle Van Horn	gayle@webworkz.com
The Fed Files	Larry Van Horn, N5FPW	larry@grove-ent.com
The Launching Pad	Ken Reitz, KS4ZR	ks4zr@firstva.com
Tracking the Trunks	Dan Veeneman	dan@signalharbor.com
Utility World	Hugh Stegman, NV6H	utilityworld@ominous-valve.com
View from Above	Lawrence Harris	Lawrence@itchycoo-park.freeserve.co.uk
Washington Whispers	Fred Maia, W5YI	fmaia@texas.net
What's New	Rachel Baughn	miteditor@grove-ent.com

Ads for **Stock Exchange** must be received 45 days prior to publication date. All ads must be paid in advance to *Monitoring Times*.

Ad copy must be typed for legibility.

1-3/4" SQUARE DISPLAY AD: \$50 per issue if camera-ready copy or, \$85 if copy to be typeset. Photo-reduction \$5 additional charge. For more information on commercial ads, contact Beth Leinbach, 828-389-4007.

NOTICE: *It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.*

Satellite TV - Large selection of items at reasonable prices. We specialize in Big Dish TVRO C & Ku Band equipment. Check us out at www.daveswebshop.com

STOCK EXCHANGE

Monitoring Times assumes no responsibility for misrepresented merchandise.

LINE ADS

NON-COMMERCIAL SUBSCRIBER

RATES: \$.25 per word — *Subscribers only!*
All merchandise must be personal and radio-related.

COMMERCIAL, NON-SUBSCRIBER, AND MULTIPLE SALES RATES: \$1.00 per word. Commercial line ads printed in bold type.

Make sure to check often at <http://www.grove-ent.com/hmpgbbb.html> for the greatest deals on used and refurbished equipment! Prices and items are updated constantly!

ELECTRONIC COMPONENTS. Parts bonanza for manufacturers, engineers, hobbyists. Thousands of chip capacitors, resistors, transistors, ICs, diodes, plus valuable items such as signal strength meters, LCDs, hardware, much more! All at a fraction of the original cost. Grove Enterprises, Inc., 828-837-9200, order@grove-ent.com.

Join the Club!

Open to hobbyists worldwide, the **CANADIAN INTERNATIONAL DX CLUB** is Canada's national, general coverage radio club serving members since 1962.

The **Messenger** features columns on AM/FM, shortwave, utilities, scanning, QSLing, pirates, ham radio and more. Send \$2 for a sample copy to:

CIDX
79 Kipps St., Greenfield Park,
Quebec, CANADA J4V 3B1
e-mail: ve2shw@rac.ca
Web: www.anarc.org/cidx/

CUMBRE DX

is the world's best DX publication. Every issue features news and loggings that you just won't find elsewhere. But the best part about Cumbre DX is that it is absolutely **FREE!**

FOR YOUR FREE SAMPLE COPY, SEND AN EMAIL TO:
cumbredx@yahoo.com

Visit us online at: www.cumbredx.org

Listening In

That's what we do and who we are!

For over 25 years we have published one of the world's leading radio magazines, *Listening In*. Now available in PDF files, in print or on tape for the sight-impaired. Mention MT and get a free sample.

Ontario DX Association
Box 161, Willowdale Station A,
Toronto, Ontario M2N 5S8 Canada
odxa@compuserve.com
www.odxa.on.ca

Windows Logging Software With Audio Processing and QSL Imaging

DXtreme Reception Log 2002™ lets you:
• Log the stations you have heard.
• Record and play-back audio clips of the stations you have logged.
• Create paper and electronic reception reports *automatically*.
• Scan, view, format your QSL images.
• Track the performance of your station.
For more info, visit us on the Web!
Be sure to register for a free prize!



Web: www.dxtreme.com
E-Mail: sales@dxtreme.com

SCANNER ANTENNAS

HF/VHF/UHF Super Discone . . . \$45.95
VHF/UHF Discone \$29.95
Mag-Mount Mobile Scan. Ant. . . . \$24.95
Super Scan Duck HandHeld Ant. \$21.95
plus S&H

See These Plus Many, Many More At:
www.antennawarehouse.com

811 9th Ave.

Camanche, IA 52730

Tollfree MC/Visa Order Line

877-680-7818

HUGE 100 PAGE CATALOG

- Shortwave & Ham Gear
- Scanners & RTTY/FAX
- Antennas & Accessories
- Radio Books & CDs.

Send
\$1 to



Universal Radio
6830 Americana Pkwy.
Reynoldsburg, OH 43068
Tel. 800 431-3939
www.universal-radio.com

**Think of what you could do
with this space...**

**It's painless, we promise.
Contact our advertising manager,
Beth Leinbach, at 828-389-4007 today!**

MT ANTHOLOGY 2001 EDITION

A Whole Year of MT on ONE CD!

That's right, an entire year of *Monitoring Times*, complete with full articles, reviews, and even advertisers, all on one CD. Completely searchable and user-friendly, this CD is the perfect companion when you're wondering "what issue was that review in" or "I remember I saw how to build that antenna in ONE of these!" Imagine being able to search for just what you need in a matter of seconds! It's the radio-room reference you've been looking for! **Order yours today!**

**Order SFT27-01 today for only \$19.95
(\$14.95 for current MT subscribers)**

Grove Enterprises, Inc. 800-438-8155

www.grove-ent.com

7540 Highway 64 West Brasstown, NC 28902



Emergency Communications “Will Anyone Be Listening?”

Guest Editorial by Ken Windyka

Let's face it: the cellular/PCS wireless revolution has arrived. With growth of over 400 percent, government emergency services have embraced this growth with various public announcements via press releases, signs, communications providers "bill stuffers," etc. about how to call in an emergency. Most users of these services believe that in an emergency a cellular or PCS phone is going to work for them; in the year 2000 users made over 13.5 million emergency calls. Sixty-five percent of all purchasers consider the emergency calling aspect as very important.

Meanwhile, we've seen a wide variety of old and new "easy access" radio communications systems being used by consumers *not being adequately addressed* by public safety officials for reporting emergency conditions. These services are used by consumers on a regular basis and have the potential of handling emergency communications requests. Citizen Band (CB), Family Radio Service (FRS), Multi-User Radio Service (MURS) – if it ever gets off the ground – and Marine Radio all have either a government-mandated monitoring (Marine Radio) or have the potential for a "voluntary" monitoring component (CB, FRS, MURS). If the cellular/PCS wireless systems were to fail, the average consumer *may* have one of these other radio systems available for their use.

However, we have cause to wonder if anyone will be monitoring these other services to provide needed assistance or to relay emergency assistance requests to proper authorities. Many areas of the country no longer monitor CB channel 9, neither officially nor unofficially. REACT's FRS channel 1 proposal was never adopted by the manufacturers or any public safety agency. MURS could be a strong contender for obtaining emergency assistance, if it could escape from its state of limbo at the FCC; it's not even listed on their website.

Whether we are active in a voluntary rescue group or not, as long as we have the technical capability to monitor these frequencies, shouldn't we radio hobbyists take it upon ourselves as a civic duty to monitor these potential emergency frequencies? We should also take the initiative to educate our federal, state, county, and local government public safety officials and the average consumer (our neighbors) about developments in low cost radio communications equipment such as CB, FRS, and MURS. We can also support efforts to get appropriate government funding for base and mobile monitoring equipment. Many agencies may already have radio systems on that particular frequency range that can be easily adapted via an additional channel programming to monitor these personal radio service frequencies.

Furthermore, we need some official designations for emergency calling frequencies in both the FRS and MURS radio systems – not as a restriction to use of a particular frequency, but as an aid in focusing emergency monitoring resources. Additionally, the public should be educated as to the capabilities and limitations of all radio/wireless systems and any particular channels or frequencies which may have

been designated for potential emergency communications. Equipment manufacturers should also be recruited to help educate the consumer regarding the use of emergency channels on the radio equipment they have purchased.

I personally have programmed my base/mobile scanner to scan all emergency frequencies (aircraft, marine, CB, FRS channel 1, and MURS frequencies). I also have a portable cellular/PCS phone and an FRS radio that scans all FRS channels while I am mobile. Furthermore, I keep a CB radio and antenna in the trunk of the car, just in case the wireless cellular/PCS system fails.

No communications system is perfect, but with standardization of emergency frequencies and a host of alert radio volunteers monitoring these frequencies, then perhaps in someone's dire time of need "someone will be listening" to provide or at least relay the emergency call for appropriate public safety agency assistance.

(See Ken's related feature story in this issue - ed.)

Protection for All

By Bob Grove

Ken's comments are well considered concerning monitoring for emergency communications. There is another public service aspect of radio monitoring, and that is reporting suspicious two-way communications (*not* cellular and cordless telephones!).

A good example is in my own backyard. Poachers often invade a local bear sanctuary, illegally tracking and killing these animals during protected seasons. While they have used CB in the past, their current – and growing – preference is hand-held VHF marine radios (156-157 MHz).

Since very few land mobile licensees are assigned inland, the illicit, unlicensed communicators stick out like a sore thumb. *"Bandit, I've got tracks here; where are the dogs?"*

Wildlife officials are appreciative of any help they can get in curbing the killing of protected game. It's another avenue of legitimizing our hobby. And while an argument could be made that revealing the contents of a radio transmission not intended for you to hear is a violation of both the Communications Act and the Electronic Communications Privacy Act, it is unlikely that a law enforcement officer receiving such information would want to prosecute the reporting citizen!

Experienced listeners with an educated ear are an excellent resource whether they are organized or not. Any public-minded hobbyist can be of value to his or her community, especially if a good relationship has already been established with local agencies.

New for 2002

PASSPORT to World Band Radio

World's #1 Selling Shortwave Guide

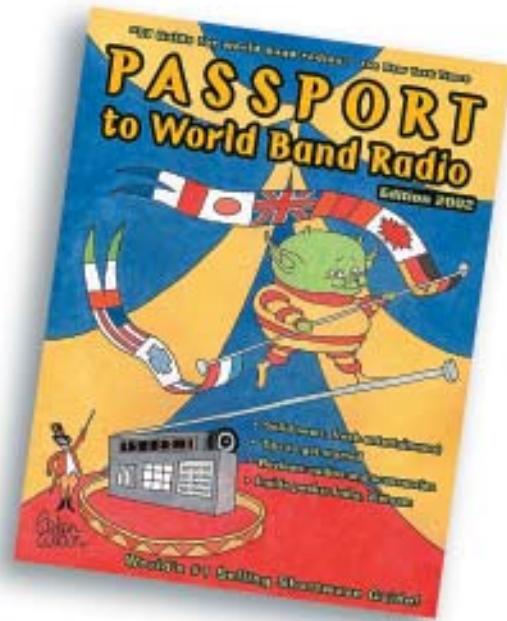
The "must have" companion to shortwave listening. **PASSPORT TO WORLD BAND RADIO** bulges with essential information, including international broadcast schedules country by country, hour by hour and frequency by frequency.

PASSPORT's Blue Pages are nearly a book by themselves—20,000 entries packed with just the information you need for every transmitter on the air. There's also a separate report on shortwave broadcasting in Asia.

PASSPORT's "What's On Tonight" contains 88 pages detailing news, music, sports and entertainment shows in English. Need station contacts and Webcasts? PASSPORT's "Addresses PLUS" chapter is the industry bible, 277 pages crammed with juicy tips.

If you're on the hunt for new equipment, PASSPORT REPORTS rates virtually every receiver from under \$30 to over \$5000—outdoor and active antennas, too. *Outside* magazine minces no words, "The best. They tell you what's good about the good, bad about the bad, and advertisers be damned."

Trusted by over a million readers since 1985.
WWW.PASSBAND.COM



No wonder **PASSPORT TO WORLD BAND RADIO** is the world's favorite guide to shortwave listening.
Available from major dealers and bookstores, or direct from the publisher at:

PASSPORT TO WORLD BAND RADIO — Edition 2002

Box 300, Penn's Park, PA 18943 • 24/7 Order Recorder (215) 598-9018 • Fax (215) 598 3794
mktg@passband.com • www.passband.com



IC-R75

Pull out the weak signals

30 kHz - 60.0 MHz¹

Commercial grade • synchronous AM detection (S-AM) • optional DSP, with auto notch filter • all mode • triple conversion • twin passband tuning (PBT) • large front mounted speaker • large display • well spaced keys and knobs • 1000 memory channels • up to two optional filters • PC remote control with ICOM software for Windows[®].

"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts." — QST, 1/98

This holiday season, 'tis better to give and receive



IC-PCR1000

The original "block box" is still best

100 kHz - 1.3 GHz¹

AM, FM, WFM, USB, LSB, CW • unlimited memory channels • real time band scope • IF shift • noise blanker • digital AFC • "VSC" voice scan control (when activated, stops only on modulated signals) • attenuator • tunable bandpass filters • AGC function • 5 meter squelch • CTCSS tone squelch • large selection of tuning steps and scans • external speaker level control • DSP optional • download and demo the latest software for free at <www.icomamerica.com>

"The PCR1000 has something to intrigue and satisfy everyone. This is a fun product." — QST, 7/98



IC-PCR100

Much like its big brother, but for less

100 kHz - 1.3 GHz¹

AM, FM, WFM • many of the same features and performance as the IC-PCR1000 • designed for Windows[®] 95 or 98 • download and demo the latest free, full version software today: <www.icomamerica.com>



IC-R8500

The experts choice

100 kHz - 2.0 GHz¹

Commercial grade • all mode • IF shift • noise blanker • audio peak filter (APF) • selectable AGC time constant • digital direct synthesis (DDS) • 1000 memory channels • RS-232C port for PC remote control with ICOM software for Windows[®].

"If you want a receiver that is both a superior world band radio and a solid scanner, the new ICOM IC-R8500 is the best choice." — Passport to World Band Radio, 1998

Great gift ideas here
www.icomamerica.com

ICOM